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## **EXECUTIVE SUMMARY**

In recent decades the structure of financial markets has change from a bank-based to a market-based financial system - an *Originate, Rate and Relocate* model. Financial regulation and crisis management have not kept pace with these changes. A lack of focus on the changing *systemic* characteristics of the financial system is a significant characteristic of Basel 2 and of the Capital Requirements Directive.

### **The threat to liquidity: homogeneous behaviour of market participants**

If markets are to be liquid and reasonably stable they should have a wide range of participants with heterogeneous objectives and methods. Markets become illiquid when actions become homogeneous – especially in the face of extreme events when everyone wants to sell. The liberalisation of financial markets has reduced heterogeneity in financial markets. Financial sector regulators are reinforcing the homogenising process by encouraging firms to use the same risk management techniques.

### **Disintermediation and crises generated by market “gridlock”**

As the global capital markets have evolved over the last thirty years a new source of credit “bank disintermediation” has grown exponentially:

The corporate bond market disintermediated the banks by directly pairing off non-bank providers of liquidity directly with corporate and sovereign borrowers:

- Assets traditionally funded on bank balance sheets (corporate loans, mortgages etc.) were moved into separate companies.
- Bank loans, bonds, credit derivatives and a growing array of retail asset backed securities (ABSs) were packaged into collateralised debt obligations (CDOs) and structured investment vehicles (SIVs) and sold to non-bank investors.

### **SIVs and CDOs**

SIVs create a channel through which the long-term debt they invest in can be funded by short-term debt.

CDOs are debt instruments that allow investors with differing risk appetites to invest in a broad range of debt instruments. Investors take different risk participations by way of tranches (equity or first loss, mezzanine and senior). Should the Portfolio experience any losses, these are first allocated to the junior tranche. Any additional losses would be absorbed by the Mezzanine tranches and, in the unlikely event of these being exhausted, by the senior tranche.

### **The central role of the Ratings Agencies**

The Ratings Agencies are an essential part of the *Originate, Rate and Relocate* model. It is very hard for investors in a CDO to understand all risks involved. The banks needed the packages to be rated by an independent and reputable third party - the credit rating agencies. The creation of the packages and their rating are not independent. Credit rating agencies gave banks software that enabled them to input a package of debt instruments and see what rating that package would acquire - packages were “built to rating”. This process is an important force of homogenisation in the selection and valuation of portfolios. Packages with the same rating in the same sectors began to look more alike.

## **Regulatory techniques enhanced the credit-crunch**

Regulatory incentives played an important role in the evolution of the 2007 credit crunch.

Many bank regulators portrayed the rapid growth of securitisation as a welcome way of bankers spreading risks more evenly. Regulatory-prescribed risk models, such as those embedded in the CRD, not only failed to provide an early warning, they signalled the all clear. Moreover, they contributed to the homogenizing of financial participants behaviour that significantly worsened the crisis.

## **Stability demands a balance of risk traders and risk absorbers**

Many of the investors who hold CDOs are set up as “traders”. They assume that if they cannot fund the assets they will be able to sell them. They trade and treat the assets as ratings with yields. They “outsource” the monitoring and understanding of the risks to the rating agencies so they have no independent view of the risks. They are not risk *absorbers*. A risk absorber needs to have the capacity to take a different view about the risks than the market place. Investors with long-term liabilities like pension funds and insurance companies are natural risk absorbers.

The transfer of risk from banks was a transfer from a risk *absorber* to entities that acted as risk *traders or amplifiers*. This did not spread risk, it concentrated it.

## **The “system” was responsible for the crisis**

The events leading up to and during the credit crisis were a complicated combination of real losses and distressed valuations causing liquidity problems. It is easy to blame those who *originated* the mortgages for being sloppy and maybe fraudulent in the underwriting process, those who packaged and *rated* the pools of mortgages for not performing better due diligence, and those who *relocated* the securities for being irresponsible in their assessment of this risk. However, it is hard to point the finger of blame at one specific group over another as opposed to all of those involved in the process. Those involved early in the chain were never going to bear the risk; those later in the chain didn’t know what the risk was. Supervisors were negligent, first in assuming that this by-product of risk-sensitivity was only for the good, and for not being more questioning of their approach to risk management when the growth of the sector exceeded all norms

## **An EU framework of financial regulation and crisis management**

EU legislation already plays an important role in influencing the development and operation of EU member state regulatory institutions. The 2007 credit crisis has demonstrated how quickly financial losses can spread across EU member state markets as counterparties in multiple jurisdictions were exposed to high levels of financial risk emanating from outside their jurisdictions. It raises the important question of whether EU legislation is adequate to meet the challenge of complex and integrated EU financial markets.

EU legislation already provides a comprehensive set of rules and principles to govern the legal and regulatory framework of financial markets in EU states. According to the principle of home country control, regulatory authority over banks that conduct activities through their branches in other member “countries” lies with the competent authorities in the EU/EEA state where the institution’s head office is incorporated. The effective application of the home country principle based on minimum standards and mutual recognition is premised on the pursuit of common regulatory objectives and trust between regulatory authorities.

Renewed in further institutional consolidation is reflected in the creation by CEBS and the European System of Central Bank's Banking Supervisory Committee (BSC) of a Joint Task Force on Crisis Management. The Task Force has issued guidance for supervisors to follow in the event of a systemic financial crisis with cross-border effect.

Similarly, the Francq Report called on EU regulators to set new targets for increased convergence in regulatory and supervisory practices and to adopt mediation procedures to resolve disputes between EU regulators. The goal is to enhance the operations of the Lamfalussy supervisory arrangements and to promote convergence and strengthen cooperation in regulatory practices across the EU.

Some progress has been made in recent years in addressing the need for improved coordination between central banks and banking supervisors within member states and across the EU during a crisis. Building on earlier Memoranda of Understanding in October 2007, the Council of Ministers approved enhanced arrangements for managing a cross-border financial crisis by authorising the Economic and Financial Committee to prepare a new Memorandum of Understanding establishing common principles, and a common analytical framework for assessing the systemic implications of a potential crisis. The MOU will also set out "practical guidelines for crisis management" that provide a common understanding of the steps and procedures that need to be taken in a cross-border crisis. Supervisory arrangements for crisis prevention must be consistent with supervisory arrangements for crisis management and resolution.

Of necessity, and pragmatically, an over-arching regulatory structure and risk-management system is emerging.

### **Lessons**

At the time of writing the crisis of liquidity in world financial markets is still unfolding. Its full and final impact can only be a matter of speculation. It is therefore premature to draw any definitive lessons. However, a number of areas merit consideration if systemic risk in the EU is to be better regulated and crisis management more effective.

- The **Working Committee on Financial Conglomerates** should be given the role of supporting member state supervisors in monitoring and coordinating supervisory activities over the twenty or so systemically relevant, largest banking and financial groups in Europe. The Working Committee should conduct research into systemic issues, working closely with the ECB in a mutually informative and supporting role. In due course, the Committee could become a focus for the discussion of systemic issues that arise not only across EU borders, but also within member states, and throughout international financial markets.
- **There should be a legal device to enable banks to be taken into public administration.** This approach would add significantly to the protection of depositors, and provide a further means for dealing with systemic crises.



- **Credit rating agencies** should be required to establish a common vocabulary, clarifying the meaning and content of credit ratings. They should not be expected to provide liquidity ratings. They should also establish a new **Self-Regulatory Organisation** to monitor all aspects of the industry (including the establishment of the new common nomenclature), to maintain a dialogue between the industry and all authorities responsible for the management of systemic risk, to promote innovation in risk modelling and policy and, to ensure that effective competition is maintained, to keep the public and the markets informed as to the activities of the industry, and to advise the public authorities.
- **Banking regulation** should introduce **Contra-cyclical capital charges**. This additional instrument could be introduced under the CRD through the supervisory discretion allowed for in pillar 2 of Basel 2. A common framework could be developed and then approved by CEBS.
- **Banks** should be subject to **Common stress tests**. Stress tests could be turned into important information instruments if regulators require all regulated institutions to carry out – in addition to any other stress tests they wish to do – two common stress tests, every six months. The first test would be devised by regulators. As a second test, regulators should also ask all regulated institutions to report the most likely stress test that leads to a point of illiquidity or insolvency for the institution. Through these few common stress tests, the process of stress testing could become an important additional information instrument for regulators and not just another compliance box for bankers to tick.
- The **CDO** baby should not be thrown out with the bathwater. Spreading credit risk (if indeed it is spread) to risk absorbers will enhance stability.
- **The Arranger of CDO should be required to retain a proportion (say, 20%) of any CDO** on its own balance sheet. This would not only encourage the Arranger to assess its own exposure carefully, it would also attract a capital charge.
- **Banks' liabilities to SIVs should be recognised on their balance sheets**, and hence in their regulatory capital. It must be recognised that in assessing the level of capital held against a backstop facility the borrower is likely to be somewhat distressed at the time of drawing on the facility. It is likely that the very economic conditions that bring about the drawing on one SIV backstop facility are likely to trigger multiple drawings. In effect, if SIV exposure could be considered to be one “collective borrower” then additional capital may need to be set aside if total exposure exceeds some “large exposure” maximum.
- The negative impact of mark-to-market requirements must be mitigated by managing them in such a way as to reduce the likelihood of disruptive forced sales. This will require regulators to take a wider view of macroeconomic conditions than they have previously done. But that is all to the good.

- Most important of all **there should be a new approach to the content and structure of regulation, supervision and crisis management.** The philosophy of financial regulation that has dominated official thinking over the past two decades, and is embodied in Basel 2 and the CRD, has failed. The approach has concentrated to an excessive extent on microeconomic risk, it has used market based, risk sensitive techniques that, in the face of extreme events, can exacerbate systemic risks, and there has been a persistent failure to incorporate systemic risks into the design of regulatory institutions and of risk management. The major lesson to be drawn from the current crisis is that a re-balancing is urgently needed. The rethink should include a greater differentiation between individual and systemic risks, recognition of the impact of the ups and downs of the economic cycle, the dangers of homogenous behaviour, and need for a balance between risk absorbers or risk traders.

## INTRODUCTION

The prudential supervision of financial markets requires continuous adaptation as the markets themselves evolve: in instruments traded, in institutional structures, and in the degrees of national and international integration. In the past decade the speed of change has accelerated. This has been particularly evident in the most recent events sparked off by the sub-prime mortgage problems in the United States. This has been a “made in America” liquidity crisis that has spread to Europe and throughout the world. In terms of institutions and market structures these events demonstrate the power of contagion in today’s increasingly integrated environment. In terms of policy analysis, it has demonstrated that modern risk modelling does not adequately represent the behaviour of market participants – behaviour that, in the face of extreme events, tends to dramatically alter the correlations on which most risk modelling is based. In terms of policy implementation, it has demonstrated that regulation and supervision, and financial crisis management have not kept pace with changing markets, and, in some cases, have exacerbated some negative aspects of those changes.

Accordingly, this Report sets out an analysis of how financial markets and institutions have changed over the past three decades, and the consequences of those changes. This analysis provides a framework within which to tackle questions of practical policy. Next, the Report turns to the inter-relationship between European institutions and changing markets. *First*, by examining the institutional structure of European financial regulation and supervision and the role of the European Central Bank as a lender of last resort and crisis manager and its relationship with EU member state regulators and central banks. *Second*, by explaining the implications today of the role of complex financial instruments in shifting financial risk to counterparties in multiple jurisdictions and considering what level of regulation, if any, is needed to bring more transparency for investors in understanding the risk they are taking on when investing in these financial products. *Third*, by analysing the role of credit rating agencies in financial markets and whether they effectively performed their functions in the recent financial crisis.

Dealing with these questions will include examination of the adequacy of existing institutional arrangements in EU financial supervision and the formulation of proposals regarding the role of regulation in overseeing credit rating agencies and bringing more transparency to the structured finance market. Other institutional issues to be considered concern the role of the European Central Bank in stemming and managing a crisis and the structure of coordinating procedures between EU member state regulators and central banks.

### 1.1 The changing structure of financial markets.

In contrast to the international regulatory developments in finance that first emerged after the breakdown of the Bretton Woods international monetary system, (e.g. the Basel Accord of 1975, Basel 1 in 1988, and so on) a lack of focus on the changing *systemic* characteristics of the international financial system has become a characteristic of international regulatory developments in more recent years. It is certainly a characteristic of Basel 2 (BCBS, 2006) one of the most important practical expressions of the contemporary theory of international regulation. And via Basel 2, it is a significant characteristic of the Capital Requirements Directive<sup>1</sup>, and of several of the regulatory initiatives now being taken by the IMF and the World Bank, and the Financial Stability Forum.

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<sup>1</sup> The Council and European Parliament formally adopted the Capital Requirements Directive on 14 June 2006. The Capital Requirements Directive comprises Directive 2006/48/EC and Directive 2006/49/EC. See Directive 2006/48/EC of the European Parliament and of the Council of 14 June 2006 relating to the taking up and pursuit of

Efficient risk-management by firms is a fundamental component of competitive success in today's financial markets. It also makes an important contribution to general market stability – in normal times. However, in the face of extreme events (even “moderately” extreme events) rational risk-management by individual firms may precipitate a macro-economic reaction that is destabilising, can place those firms in jeopardy, and result in a general welfare loss.

The classic example is a bank run. A depositor at a particular bank would be willing to leave funds on deposit, but believes that other depositors are likely to react to an adverse event by withdrawing their funds, forcing the bank to call in loans or sell securities and suffer losses, perhaps even suspending payments. Consequently, a rational investor will seek to be the first to withdraw funds at the first sign of serious trouble. Hence all withdraw their funds as rapidly as possible when there are adverse developments resulting in a “run”. A run on one particular bank necessarily effects the perception of the liquidity of other banks and the run spreads to other, nominally solvent, banks<sup>(2)</sup>. More formally, whilst a depositor may be certain about the probability of suffering a liquidity shock, the depositor cannot be certain about the probability that his or her shock will occur early or late relative to others. In other words, the depositor cannot be sure where they will be in the queue to withdraw funds. The result is the rush to withdraw (Caballero and Krishnamurthy, 2006, p.8).

However, in recent decades the structure of financial markets has changed, shifting from a bank-based to a market-based financial system (Hendricks, Kambhu and Mosser, 2006) with banking now following an *Originate, Rate and Relocate* model. Financial intermediation has moved from banks into markets, and as a consequence of this disintermediation, financial crises are now manifest in markets rather than institutions. Accordingly analytical interest has moved from bank runs to “market gridlock” as a source of systemic risk<sup>(3)</sup>. A market oriented systemic crisis is a breakdown in the functioning of markets for traded assets. It may be triggered, for example, by a sharp decline in the price of one asset that sparks a widespread sell-off in the general rush for liquidity.

Again, in more formal terms, the individual agent knows the probability of a shock, but does not know the probability of being able to trade with the market counterparties on whom his or her liquidity depends. Not knowing, and being averse to uncertainty, the agent, and all other agents, has a collective bias toward liquidity (Caballero and Krishnamurthy, 2006, p.15). The collective rush for liquidity produces the market gridlock characteristic of market based systemic crises. It is important to note that a relatively small event can produce this gridlock in very large markets.

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the business of credit institutions (recast) OJ L 177, 14.6.2006, p. 1; and Directive 2006/49/EC of the European Parliament and of the Council of 14 June 2006 on the capital adequacy of investment firms and credit institutions (recast) OJ L 177, 14.6.2006, p. 201.

<sup>2</sup> Before the introduction of deposit insurance in the twentieth century, bank runs were common in Europe, UK and the US. In the late nineteenth century there were approximately one major bank run every decade. During the National Banking Era in the United States (1863-1914), there were five major bank runs: 1873, 1884, 1890, 1893, and 1907.

<sup>3</sup> The crises at IKB and at Northern Rock are examples of market gridlock, not of a bank run. In the case of Northern Rock the bank run was not a *cause* of Northern Rock's difficulties, but a *result* of the crisis and of the preliminary response of the authorities.

## 1.2 Externalities and the macroeconomics of systemic risk

Financial risk-taking is a concern of public policy because associated with the risk-taking actions of individuals there are externalities; i.e. costs and benefits accruing to the society that are *external* to the calculations of the individual investor, and not accounted for in the market place<sup>4</sup>). A major financial failure imposes costs on society going far beyond the losses suffered by the immediate investors. In an economy where there are important externalities, competitive markets will be socially inefficient. The task of public policy, in this case of financial regulation, is to attempt to mitigate these market failures.

Financial externalities are particularly potent because they are transmitted *macroeconomically*. Financial markets are markets for stocks of current and future assets, the value of which today is dependent on the expectation of their future value. To the extent that expectations are shared any factor that leads to a general shift in expected future values will have an immediate impact on financial markets, and on the major macro-financial variables, such as the interest rate and the exchange rate. So the failure of a single firm can, by influencing expectations, have an influence not only on its immediate counterparties, or even just on firms dealing in similar products, but also, through its impact on expectations, on financial markets as a whole, and then via the interest rate or the exchange rate, the contagion may spread to the whole economy.

Yet despite the presence of externalities and potential contagion, a peculiarity of market expectations is that they can be remarkably stable (or tranquil) for substantial periods of time, even when underlying real circumstances might be decidedly unpropitious. Periods of tranquillity defined by stable expectations and stable market confidence may sustain the illusion that, despite evidence to the contrary, financial markets are truly reflecting a strong and balanced real economy. The shattering of that illusion can be catastrophic. In consequence, the financial markets can resemble the cartoon character who, having run off the edge of the cliff remains suspended for some time in the mid-air, with no visible (or rational) means of support, before suddenly plunging into the abyss.

One of the tasks of financial regulation is to keep markets away from the cliff edge, and when they rush over, to ensure that the damage to the economy as a whole is minimised.

## 1.3 The analytical framework

### 1.31 Homogeneity

If markets are to be liquid and reasonably stable then, as Avinash Persaud has emphasised (Persaud, 2000, 2001) it is not enough that markets should be large, it is also a fundamental requirement that they should be characterised by a wide range of participants with heterogeneous objectives and methods *and* with confident expectations that markets will be relatively stable. A market is liquid when buyers are broadly balanced by sellers. Markets become illiquid when actions become homogeneous – especially when everyone wants to sell.

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<sup>4</sup> There are a number of other important market failures in the financial sector which attract the concerns of public policy, most notably the asymmetry of information between individual savers and market professionals that is the motivation of consumer protection legislation. This Report deals solely with the market failure manifest in systemic risk, and the implications for risk management by the authorities.

A number of factors contribute to the relative heterogeneity of actors in financial markets:

*First*, individual investors and traders must be highly heterogeneous with regards to their objectives, risk preferences, time horizons, market valuations, structures and infrastructures. In economics this was traditionally described as the difference between those seeking income certainty and those seeking wealth certainty, with the implied different patterns of risk aversion, time horizons and so on (Robinson, 1951),

*Second*, investors may have differing access to information, so even if their goals might be the same they will behave differently.

*Third*, when the general opinion is that markets are stable, then stability becomes a convention. Convention (meaning belief in stability) is vital in financial markets, because convention *creates* and *sustains* heterogeneity. This power of stable expectations should not be underestimated – by defining the *expected* range of movements in asset prices it fixes (at least for a while) the *actual* range of fluctuations in current asset prices. But of course once convention is breached, then the flood will follow<sup>(5)</sup>.

*Fourth*, investors may be forced, by government regulation, into segmented markets – where heterogeneity is effectively imposed by the authorities. For example, the UK mortgage, insurance and cash deposit markets used to be legally separated. Part of this separation was achieved through non-price mechanisms such as credit rationing and queuing as was common in the hire purchase and mortgage markets in Europe. Similarly the Glass-Steagall Act (1932) segmented US financial markets. Exchange and capital account controls segmented national financial markets.

Taking these four dimensions as a starting point it is clear that the liberalisation and hence internationalisation of financial markets that has taken place over the past three decades has inevitably reduced heterogeneity in financial markets.

By definition liberalisation and internationalisation have broken down market segmentation – allowing cross-market correlations to rise sharply at times, in a way that would not have been possible before.

And with liberalisation has come a growing professionalisation of financial management (BIS, 1998, chpt.V), and extensive conglomeration of financial institutions (Group of Ten, 2001; IMF 2004a, 2004b). Most investments are now managed by mutual funds, pension funds, insurance companies and so on; and these funds are themselves locked into sophisticated wholesale money markets, securitising and packaging and hence homogenising funds from previously segmented markets. Professionalisation has reduced the heterogeneity of investor preferences as expressed in the marketplace. The professional investor is subject to a continual competitive pressure to maximise (short-term<sup>(6)</sup>) returns, and is constrained by the well-known institutional dilemma that “it is better for reputation to fail conventionally than to succeed unconventionally” (Keynes, 1936, p158). So whatever the preferences of the private investor might be, convergence on “professional” or “conventional” strategies by institutional investors are homogenising the market. And with professional investment go professional information services – both in sources and processing – again making for a more homogeneous environment.

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<sup>5</sup>. The most powerful convention of all is that imposed by governments. When the exchange rates of the future Eurozone currencies were declared prior to being irrevocably fixed on 1<sup>st</sup> January 1999, the markets rapidly converged on those rates.

<sup>6</sup> “... there is a peculiar zest in making money quickly, and remoter gains are discounted by the average man at a very high rate.....It is the long-term investor ... who will in practice come in for most criticism, wherever investment funds are managed by committees or boards or banks” (Keynes, 1936, p.157).

Conglomeration is clearly a major homogenising force too. As conglomeration proceeds risk management procedures acquire common characteristics throughout the financial sector, whether in banking, securities, fund management or insurance. Where once management techniques were sector specific, they are now becoming firm specific, applied across all sectors of the firm's activities.

In addition, a major focus of this Report, increased Credit Risk Transfer (through credit derivatives and other forms of securitisation), may also be a homogenising force. In principle risk transfer can enhance the heterogeneity of risk bearing, transferring risks from those without an adequate capacity for it to those who do. But risk transfers do not inherently do this and a number of questions arise from any risk transfer: Has risk been better spread or has it been concentrated, either through a small number of intermediaries or through a large number of investors with homogenous behaviour. Has risk been transferred to those institutions with a greater capacity for the risk in question, or merely those with a greater appetite for risk premia. When a risk erupts has the transfer of risk made it easier or harder for central banks to mitigate the wider, systemic, impact. How does the CRT change the risk-taking, risk-absorption and risk monitoring capacity of both buyers and sellers of risk? We aim in this report to address some of these questions but we would be the first to say that they are as yet unresolved, with only tentative answers on offer (see also Bank of England, 2001; FSA, 2002; IAIS, 2003; BIS, 2004; BCBS, 2004; Wagner and Marsh, 2004). However, what does seem clear is that risk transfers were a powerful homogenising force across financial institutions<sup>(7)</sup>.

### **1.32 Regulation and homogeneity**

Financial sector regulators are tending to reinforce the homogenising process. The most important reaction to the recurring crises that have followed the process of liberalisation since the 1970s has been the development of international regulatory standards and procedures. In this context the IMF-World Bank Financial Sector Assessment Program (FSAP) is of particular note since it locates regulation within a treaty framework under Article IV of the IMF Articles of Association. FSAP surveillance concentrates on the adherence of national regulation and practices to core principles developed by the Basel Committee, together with the International Organisation of Securities Commissions (IOSCO) and the International Association of Insurance Supervisors (see IMF, 2004a, 2004b). But it is in the principles underlying Basel 2 that the most important intellectual foundations of the new international financial architecture are revealed.

These principles are expressed through the three pillars of Basel 2: Pillar One - the determination of regulatory capital now heavily weighted toward use of banks' internal risk weighting models, as well as the views of ratings agencies; Pillar Two - supervision; and Pillar Three - market discipline enforced by greater disclosure of banks' financial status as well as their internal risk management procedures.

What is particularly noticeable is the emphasis on the role of firms' own risk management procedures and on market discipline. A rather odd way to confront systemic risk, which is by definition an externality that internal procedures do not encompass and is not accounted for in the market place.

But perhaps of even greater importance is that Pillar One and Pillar Three will tend to increase the homogeneity of financial markets.

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<sup>7</sup>. 'With higher activity in risk transfer markets, financial market participants with traditional business lines could assume completely different roles as "virtual insurers" or "virtual bankers"' (OECD, 2002, p.2).

*First*, there is the emphasis on the use of firms' internal risk management systems, systems that are by definition, market sensitive. Whilst firms' models may differ in detail, they are constructed on similar analytical principles, estimated on similar historical data, and sensitive to the same market information.

Modern risk management practices will result in firms holding a portfolio of assets that exhibit in quiet times high expected returns, low price volatility and low price correlation with other instruments and assets. The composition of the set of assets that exhibit these characteristics will therefore be shared by many investors. Suppose however that the volatility of a given asset rises sharply. The rise in volatility will cause the risk models to signal that a reduction in risk is required and best achieved by selling those assets where volatility has recently risen. As all those investors who share similar assets try to sell the same assets at the same time, volatility will rise further, spilling over to other instruments, leading to a rise in correlation, causing risk models to signal that further selling is required. Previously uncorrelated assets are now correlated in the general sell-off, enhanced by the model driven behaviour of other institutions caught up in the contagion<sup>8</sup>). The attempt to reduce risk, augments its rise.

Whilst in normal times such models may encompass a wide range of behaviour, in extreme circumstances the models will encourage firms to act as a herd, charging toward the cliff edge together (Persaud, 2000).

*Second*, the emphasis on disclosure reduces the diversity of information that has in the past created diversity of views. Today information is ever more readily available, and disclosure of price sensitive information is legally required before it can be traded upon. Insider dealing on private information is, rightly, characterised as market abuse. But the attainment of equal information is bought at a cost – increased homogeneity and hence potentially reduced liquidity.

In the light of the enforcement of greater homogeneity by Pillars One and Three, considerable weight is placed on Pillar Two (enhanced supervision) to inhibit the behaviour that generates systemic risk. Unfortunately it is not at all clear that an essentially subjective, personal interaction between bureaucrat and risk taker can be either consistent or effective, particularly on an international scale (Ward, 2002; IMF 2004a).

The drive toward homogeneity is not confined to the Basel 2 banking proposals. Regulators are responding to the creation of seamless financial markets, spanning banks, securities firms, insurance companies, pension funds, and so on, by requiring that they all follow the same regulatory regime. For example, in considering the relationship between banking and insurance, Sir Howard Davies, then Chairman of the UK Financial Services Authority argued "Our general view is that the capital treatment should in principle be the same, where the risks are the same" (Davies, 2002). The homogenising pressure exerted by the regulators was evident in the UK Financial Services Authority's Consultation Paper 142 on *Operational risk systems and controls* (which enunciates policies that apply to all regulated firms) and is a defining theme of the Capital Requirements Directive and the Market in Financial Instruments Directive.

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<sup>8</sup>. The change in correlation is a market manifestation of what the individual agent cannot know prior to an "abnormal" event.



### **1.33 Strategic behaviour**

To the increased homogenisation of financial markets must be added a further, potentially yet more destabilising phenomenon: strategic behaviour by market participants.

The essence of strategic behaviour in financial markets was captured by Keynes in his famous analogy of a “beauty contest”. In Keynes’s contest beauty is not in the eye of the beholder. Instead, the game is won by those who can accurately assess what others think is beautiful. In financial markets, it is knowing what others believe to be true that is the key to knowing how markets will behave. The market is driven by participants’ belief about what average opinion believes average opinion believes ..... and so on (Keynes, 1936, chpt.12; Eatwell and Taylor, 2000, chpts.1 and 3; Morris and Shin, 2002).

Such strategic behaviour is notable by its absence from the predominant models of asset pricing, whether Black-Scholes or later variations on the theme. In these models the individual agent is portrayed as an independent atom, unheeding of the actions of others. Once strategic behaviour is taken into account, then, even in quite simple models, prices can be shown to deviate systematically from what might be deemed to be competitive market prices (Persaud, 2003). Bubbles are generated by the same behaviour (Allen, Morris, and Shin, 2006).

It is not hard to see that homogenisation will interact with and encourage strategic behaviour. As markets become more homogeneous agents will become increasingly aware of the interdependence of their actions. The changing character of financial markets has resulted in greater homogenisation, and a greater tendency toward strategic behaviour, especially in the face of extreme events.

## **2. THE NATURE OF MODERN CREDIT MARKETS AND THE ORIGINATE, RATE AND RELOCATE MODEL OF MODERN BANKING**

For most of modern history the availability of credit has been segmented into two markets: the banking and mutual savings institutions and what may be described as the informal lending sector: a plethora of informal, unregulated direct lending mechanisms (person to person, credit co-operatives, micro lending, and so on). Whilst a significant proportion of retail and small business lending may have gone through the informal markets, the majority of borrowing and almost all large corporate borrowing have gone through the banking market.

As the global capital markets have evolved over the last thirty years a new source of credit has grown exponentially. This is generally referred to as “bank disintermediation”. The whole corporate bond market effectively disintermediated the banks by directly pairing off non-bank providers of liquidity with corporate and sovereign borrowers. The banks themselves benefited from the growth of non-bank bond investors by tapping this sector for their own senior and subordinated liquidity needs. Having established a huge investor base of non-bank credit investors the next step in the bank disintermediation process was to allow assets traditionally funded on bank balance sheets (corporate loans, mortgages etc.) to be moved into separate companies and be financed by these same non-bank liquidity providers.

It is this latter development that has seen enormous growth over the last decade as bank loans, bonds, credit derivatives and a growing array of retail asset backed securities (ABSs) were packaged into collateralised debt obligations (CDOs) and structured investment vehicles (SIVs) and sold to non-bank investors. Understanding the drivers for this change requires consideration of the motivations of both the banks and the fixed income investors, as well as the impact of the development of new products.

### **2.1 Bank motivation**

Traditionally, the basic economics of lending focused on the returns generated by raising money from depositors, the inter-bank or wholesale debt markets and lending it at a higher margin to corporate and retail borrowers. A certain amount of equity capital is needed to allow a bank to do this and, given the high operating costs of running a bank, the credit losses associated with lending, the costs imposed by banking regulations such as capital adequacy requirements, and the generally competitive bank environment, the return to equity investors from pure lending was traditionally less than 10%. Over the past decade banks were able to push this return into the high teens by supplementing the low return high-risk business of lending with a high return, low or no risk business of advisory and transactional services such as cash management, foreign exchange and mergers and acquisitions. However, to enjoy these high margin businesses the bank needs client relationships and these normally come with a requirement to lend. So the high margins of non-lending are normally diluted by the low margins of the supporting loan book. With bank disintermediation the need to hold expensive assets disappears. For the first time in banking history, banks were able to enjoy all of the benefits of their franchise without some of the balance sheet costs.

## **2.2 Fixed income investors**

It is impossible to disentangle whether the supply of fixed-income assets created the demand or vice versa. But it is certainly the case that the revolution in the banking sector described above coincided with a revolution in the demand for credit fixed income assets. In part this demand was supported by the combination of developments.

The first, was the regulatory pressure for long-term financial institutions, like pension and insurance providers, to match their liabilities with fixed-income assets. This pressure often came in the form of mark-to-market and solvency requirements. Second was a requirement to provide financial benefits that matched earnings and economic growth at a time when government bond yields were being weighed down by the initial downward impact on inflation from the arrival of China and India into the world trading system and the recycling of Middle-East and Asian surpluses into government bond markets. This circle was squared by ABSs, CDOs and SIVs – the major components (discussed below) of the so-called structured credit or structured finance markets.

Historically the risk associated with lending was distributed via bank balance sheets and was available to fixed income investors in the form of bank senior and subordinated debt. However, in comparison to the tailored and innovative structures employed in the structured credit markets, bank debt is a very blunt instrument. There is no transparency as to the underlying portfolio, a bank is not a pure credit play and there are essentially only two levels of risk participation. It was easy to persuade investors to use the more flexible and apparently transparent structured credit solutions. This was also ideal for a banking sector keen to have more flexibility to separate risk from franchise.

### **3. FINANCIAL INNOVATION: AN ANATOMY OF CREDIT DERIVATIVES, SIVs AND CDOs**

#### **3.1 Credit derivatives**

Whilst the growth of the structured credit market was driven in part by the desire of the banks to move capital intensive assets off balance sheet and by fixed income investors hungry for credit risky assets, one of the innovations that enabled this to happen was the development of the credit derivative market that over the last ten years has transformed the trading of credit risk. Credit risk (risk of default) is essentially “sticky”: it is very hard to move because of legal restrictions, relationship issues, accounting obstacles, tax and operational challenges. Many of the most recent developments in the structured credit market have been possible because credit derivatives have removed some of these obstacles.

A credit derivative in its simplest form – the most common product is the Credit Default Swap (“CDS”) – transfers the credit risk of a debt instrument from one party to another. This process is often referred to as synthetic credit risk transfer. The effectiveness of the risk transfer is only as good as the legal contract between the two parties. For every party taking on the risk, there is another party laying it off. Should the risk managing party actually own a debt instrument that needs to be hedged and the risk taking party take on the risk with a view to holding it, that is the simplest application of credit derivative usage. However, since there is no requirement for the risk manager to actually hold any debt instruments, nor is the risk taker required to hold the risk to maturity, the two parties may just be trading the credit risk. This is the more common application of credit derivatives.

A combination of risk management and trading ensures both a supply of synthetic credit risk and a well-established secondary market. Should one party decide to bundle pools of this risk into a Collateralised Debt Obligation (CDO, see section 3.3 below) and sell tranches to investors, the credit derivative is merely assisting in the functionality of the transaction. Securitisation of debt products has been around since long before the first credit derivatives were used. Synthetic credit risk is merely another asset class within the underlying portfolio. If a CDO transaction fails due to poor structuring of the risk or actual losses within the portfolio this does not mean that the credit derivative product is flawed. The flaw is most often with how these instruments are used.

#### **3.2 Structured investment vehicles (SIVs)**

The use of Conduit Financing Vehicles (CFVs) or Structured Investment Vehicles (SIVs) is extensive and was established in the late 1980s. The structures disintermediate banks by enabling a range of long dated debt instruments to be financed by short-term debt. To the extent that short-term financing becomes unavailable, the structures use a backstop facility provided by a bank. This secondary source of financing is designed to plug any financing gaps and generally will only be used when liquidity is in short supply. As a result of the backstop, the ratings agencies were prepared to give the short-term debt a high credit rating. (With hindsight this looks odd as the bank backstop would only be utilised under conditions where banks would already be under stress and it would add to that stress.)

A SIV is structured as a special purpose vehicle<sup>(9)</sup> (SPV) that buys long dated assets such as debt instruments and finances the purchase by issuing short-term debt such as commercial paper (see section 3.21 below). The debt instruments that the SIV buys can be corporate debt – bonds and loans, or retail debt - pools of mortgages, credit card receivables, car loans, and so on. The SIV normally enjoys a healthy profit due to the fact that short-term borrowing rates (that the SIV pays) are conventionally less than the return on the longer dated corporate credit assets. SIVs can be very profitable because they are highly leveraged and the returns on the small amount of equity invested in them may therefore be very high.

SIVs are called “conduits” because they create a channel through which the long-term debt they invest in can be funded by short-term debt. The business model (borrow short term, lend long term) is very similar to that of a bank, but by conducting its business through capital markets (rather than taking deposits) and by being an offshore entity a SIV escapes the capital adequacy regulation to which banks are subject.

### **3.21 Commercial paper**

Commercial paper is a short-term debt instrument issued by a company. Normally it is unsecured, short term (less than one year) and not very liquid. It is mainly used to provide short-term financing requirements and as it must be repaid after a comparatively short time it would not normally be tied up in long dated assets. The savings made by issuing commercial paper over raising money by simpler means such as borrowing from a bank, are fairly small in terms of the difference in interest rates. This means that commercial paper is usually useful only for raising fairly large amounts. This combined with its short-term nature means its use is restricted to large borrowers.

### **3.22 Managing SIV risks**

Given the difficulties encountered by SIVs in the second half of 2007, it is worth rehearsing the risks to which SIVs are exposed.

*Credit risk:* the assets in the SIV are risky in that they are exposed to issuer default risk. Where the asset is synthetic (for example a CDS) then in addition to issuer risk there is also counterparty risk. Although the assets in a SIV are generally of high quality, the SIV will need (i) processes for credit decisions and portfolio monitoring, and (ii) limits to control exposure by company, sector, country and rating. Minimum standards for the latter are normally set by the Rating Agencies to give the SIV debt the best possible rating.

*Liquidity risk:* the SIV has a continual refinancing need as the maturity of the assets is often significantly longer than the financing represented by the SIV's debt. A number of safeguards are employed: the highest credit rating is maintained to ensure access to a wide range of investors; diversity of investor is achieved by using multiple debt programs throughout the global capital markets; controls ensure that the funding requirement at any point in time does not exceed a set limit; and, normally, the SIV would expect to be able to quickly liquidate the highest quality assets to raise additional funds. If all else fails a backstop facility is in place with a bank to fill any funding gaps.

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<sup>9</sup> A special purpose vehicle (SPV) or special purpose company (SPC) is a company that is created solely for a particular financial transaction or series of transactions. It may sometimes be structured as a trust. SPVs are often used to make a transaction tax efficient by choosing the most favourable tax residence for the vehicle. They can remove assets or liabilities from a bank's or corporate's balance sheet, transfer risk and in securitisations allow the effective sale of future cash flows.

*Market Risk:* to the extent that the SIV is exposed to interest rate or exchange rate risk, limits are put in place and active hedging ensures that these risks are minimised. The objective is to make the SIV insensitive to market risks.

*Operational Risk:* a SIV would normally have procedures, control and necessary reporting to address operational risk: the possibility of losses resulting from sub-standard or failed internal processes. The combination of rating agency and auditor reviews and reporting is considered adequate to mitigate these risks.

### **3.3 Collateralised debt obligations (CDOs)**

CDOs are debt instruments that allow investors with differing risk appetites to invest in a broad range of debt instruments that would normally reside on bank balance sheets. This tool for disintermediating banks has two important characteristics: firstly, investors take different risk participations by way of tranches (equity or first loss, mezzanine and senior); Secondly, the range of debt instruments covers the full spectrum of borrowers: from retail to large corporate, from loans to bonds, from high quality to low quality, and from liquid to very illiquid.

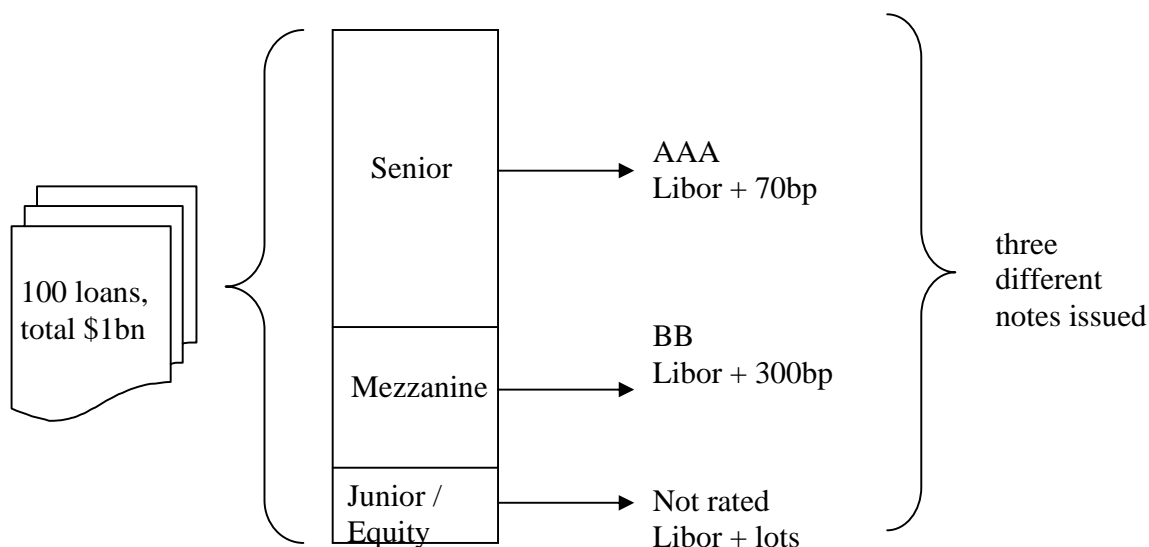
The CDO market evolved from the older CBO (bond) and CLO (loan) markets, the name change reflecting the fact that the underlying assets in CDO transactions include a broad range of debt related products. The traditional CDO structure involves the issuance of bonds – “debt obligations” - by an SPV such that the bonds are “collateralised” by a portfolio of assets owned by the SPV.

The market has evolved considerably since the early transactions and many of today’s transactions are neither collateralised nor debt obligations: both the collateralisation and the debt obligations can be replaced by credit derivatives. The risk of the assets can be transferred using credit derivatives and the form of the investment can also be a credit derivative: no assets need be bought and no debt need be sold. Despite these changes, the term CDO is still used and generally refers to structures where investors have varying levels of risk participation in large diversified portfolios of credit risk. CDOs are normally described as either Balance Sheet CDOs or Arbitrage CDOs (see section 3.5 below).

#### **3.31 The Structure and Characteristics of CDOs**

The basic mechanism behind a CDO involves the sale of a pool of assets (the “Portfolio”) to a SPV set up by the deal arranger (the “Arranger”, normally a bank or securities firm). The SPV finances the purchase of the Portfolio by issuing bonds (or notes) to investors.

Rather than issuing one large bond issue, it is more cost effective for the SPV to issue a number of different tranches of bonds, each tranche having a different claim on the Portfolio. These tranches are generally referred to as “Junior”, “Mezzanine” or “Senior”. In a typical transaction there will normally be one Junior tranche, one Senior tranche and at least one but sometimes a few Mezzanine tranches. The term Junior can be used inter-changeably with the term “Equity”.



Should the Portfolio experience any losses due to the failure of individual assets, these losses are first allocated to the Junior tranche. Hence a US\$5 million loss by the portfolio would result in the redemption amount of the Junior bonds being reduced by that amount. Further losses would lead to further reductions. Should the Portfolio experience multiple losses, the Junior tranche may be insufficient to absorb all the losses and may have its notional value reduced to zero. Any additional losses would be absorbed by the Mezzanine tranches and, in the unlikely event of these being exhausted, by the Senior tranche.

The use of tranches is driven by the fact that investors in debt instruments have differing risk/reward criteria. Conservative investors are looking for low risk assets and hence are prepared to accept lower returns than more speculative investors who expect high returns but accept higher risks. By structuring a CDO with multiple tranches, the Arranger can offer a variety of risk packages and hence has access to a much wider universe of investors. The Senior tranche will often get a triple 'AAA' rating, the Mezzanine tranches can range from double 'AA' down to single 'B' and the Junior tranche is not normally rated as, depending on the underlying assets, the probability of receiving timely interest and eventual principal is so low that it is worse than that associated with triple 'CCC' corporates and hence a rating is of no use to an investor. The returns of these tranches vary considerably and hence the Arranger can access the spectrum of investors from the most conservative to the most speculative.

However, the Arranger has to sell the Mezzanine and Junior tranches and herein lays the biggest challenge: as the quality of the tranches deteriorates so the task of selling these tranches gets harder.

### 3.4 Market Participants

CDOs are financial instruments that are mainly arranged by banks and investment banks and are sold to a wide range of financial investors. By their very nature CDOs are attractive investments for both the most conservative and the most speculative investor.

The structuring techniques described above enable high levels of customisation and hence the market has been transformed from an issuer led market – “here’s an idea, who can we sell it to?” – to an investor led market – “this is what I want – who can sell it to me?”

In addition to customisation, investors are drawn to the market by the diversification of the credit risk embedded in each structure. Much of this risk is not readily available to non-banks that, outside the structured credit markets, would normally be limited to buying bonds. The universe of borrowers that use the bond market is small compared to the loan market. With a few exceptions, loans are not readily available to non-banks and are not readily available to all banks. The CDO market has changed this in a dramatic way, bringing large amounts of new credit risk to asset hungry investors.

The growth and appeal of the CDO market has been accompanied by some important structural changes within the investor community. Accounting and actuarial conventions, along with stock market volatility, have supported a shift in asset allocations in favour of debt (away from equity) and to meet the demand for fixed-income returns, fund managers have negotiated changes to their investment mandate to enable structured products with embedded derivatives to be an approved product type. The results of these and other changes have brought investors such as re-insurance companies, general insurance companies, pension funds, mutual funds, hedge funds and high net-worth individuals to the CDO market. These investors share a common desire to invest in debt instruments but have dramatically different structural requirements. These differences are generally as a result of investors differing risk/reward criteria.

### **3.5 Arranger Rationale for the creation of CDOs**

Balance Sheet CDOs are initiated by holders of large portfolios of debt instruments, who desire for some reason to sell the debt instruments outright, or to offload the credit risk from those debt instruments without legally selling them. The reason is normally one of the following:

#### **3.51 Balance Sheet Management**

Any company is sensitive to the size of its balance sheet. Normally the pricing of its liabilities is a function of the size of its balance sheet. Simply stated, the more assets a company has, the more liabilities are needed to finance these assets. To the extent that these liabilities are debt (as opposed to equity), this introduces more leverage, makes the company look riskier and hence pushes up the return expectations of both debt and equity investors. This ultimately translates into a higher cost of capital.

Banks are very sensitive to this and hence are constantly monitoring the size of their balance sheets. When the decision is taken to reduce assets the number of options available is limited. Outright sale is one of them but where the underlying assets are loans this is hampered by two factors: first, illiquid loans can be hard to sell; secondly, loans sales (normally to other banks) are never popular with the borrower who normally prefers not to see its pool of creditors change.

For these two reasons banks were drawn to using CDOs to manage their balance sheets. Illiquid loans can be sold into a CDO more easily than into the secondary loan market. Furthermore, borrowers are more comfortable with their loans being owned by an SPV (which is normally operationally managed by the Arranger).



### **3.52 Regulatory Capital Management**

Banks are required by their regulator to report their Risk Based Capital (“RBC”) ratio – equity capital (and some subordinated debt) divided by the notional value of any risky assets. Banks monitor their RBC ratio very closely and, from time to time, will take steps to manage it.

The sale of corporate assets is one way of managing it as the notional value of risky assets is reduced. A Balance Sheet CDO is a very effective way of managing a bank’s RBC as a large number of loans are sold in one transaction. This is often referred to as “freeing up capital” and is part of the overall process known as “Regulatory Capital Management”. Since a bank has a finite amount of capital, there is a quantifiable maximum amount of corporate debt that can be taken on. Selling or hedging debt frees up the capital that was allocated and allows it to be used for (hopefully profitable) new lending .

### **3.53 Economic Capital Management**

In addition to Regulatory Capital, an increasing number of banks now manage “Economic Capital” – the equity capital that is needed to support the risks associated with holding assets. Whereas the Basel 1 regulatory approach uses a “one size fits all” approach and merely requires an 8% allocation of RBC, the economic approach uses a model to calculate how risky a portfolio of assets is and how much capital is needed. The intention of Basle 2 is to link regulatory capital to risk (“risk-sensitivity”) and hence represents a migration from Basel 1 to economic capital management. While this sounds sensible in principle there are substantive definitional issues. Whose risk should the regulator be focused on – the bank’s risk or systemic risk? How do we measure risk when we are worried about market failures – using historic prices, market forecasts or non-market measures? We shall return to these issues in greater detail in Section 4.

From an Economic Capital perspective there are three main contributors to risk: the risk of a particular asset (e.g. its issuer may go bankrupt tomorrow), the risk of holding too large an exposure to a particular issuer (100 loans of \$1 are less risky than one loan of \$100 if the hundred are diversified), and the risk of being exposed to an industry sector that is correlated (during a severe economic downturn all airline issuers tend to suffer and, because they are correlated, tend to look like one large exposure). Further, each of these risks change with the length of the holding period. Whilst the first of these risks can be assessed independently, the other two require a portfolio analysis as the risk of the whole is different from the risk of the parts.

### **3.54 Risk management**

Any transaction that results in the sale of assets that are risky for the institution to hold should have a risk management benefit. Hence a Balance Sheet CDO would generally result in risk reduction. It is unlikely that the only rationale for a CDO is risk management; it is more likely to offer a combination of benefits. A bank may use a CDO to dispose of risky assets but is normally mindful of the fact that investors may share the same negative sentiment and hence there may be little net commercial advantage from the transfer. A bank may also use a CDO to manage its credit lines – the internal limits placed on the total credit exposure to any one issuer. Often banks want to do more with a particular client but are constrained by internal limits. Moving the risk (into a CDO or elsewhere) frees up the credit line.

### 3.55 Cost Considerations

To understand the “Arbitrage” concept in a CDO, consider a Portfolio that has an average credit rating of single ‘A’. This could be financed with one large bond issue sold to investors with an appetite for single ‘A’ investments. However, by issuing multiple tranches to finance the Portfolio, the Arranger can produce an array of rated bonds to cater to a variety of investor needs.

In a typical CDO transaction the Junior tranche has a notional value of 1-3% of the Portfolio notional value, the Mezzanine tranches are equal to 5-15% of the Portfolio notional value and Senior tranche picks up the balance, normally in excess of 85% of the Portfolio notional value.

Should the Portfolio have a notional of US\$1 billion, then the Junior tranches will be a few tens of millions, the Mezzanine one hundred or so and the Senior will be many hundreds of millions of dollars.

Rather than issue \$1 billion of single ‘A’ bonds at say Libor+200bp the Arranger can issue \$900 million triple ‘AAA’ bonds at Libor+60bp leaving the balance to be offered as a premium on the remaining tranches. To the extent that the coupons of the remaining tranches require less than this balance there will be a saving – this is the “Arbitrage” that gives the structure its name. The Arranger is able to finance the assets at a cost that is less than the income from the assets being financed.

Another cost saving variation involves using a “Super Senior Swap” counterparty to the AAA risk. This is normally taken by a reinsurance or monoline insurance company in the form of a Portfolio Swap. Pre-credit crisis, such institutions demand a premium of 10-15bp thus giving the Arranger a significant cost saving over issuing triple ‘AAA’ bonds at Libor +60bp.

### 3.6 Investor Rationale

Changing asset allocations have brought significant new funds to the CDO market. There are several aspects of CDOs that are not offered by any other currently available financial product:

- CDOs are tailored to the investor and create customised risk / reward exposures. For example, the average credit spread and the types of debt instrument in the asset pool will be selected to appeal to certain investor types.
- CDOs can be tailored to have high returns, but with very low past correlation with the equity market. Therefore they are attractive to investors looking for high returns outside the equity market.
- CDOs are diversified instruments. The asset pool of most CDOs is comprised of debt issued by more than 100 different borrowers. Diversification brings both risk/return benefits and reduces the granularity of default losses. Not only is it safer to invest in 100 \$1m loans to different borrowers than one \$100m loan to one borrower, with the same credit rating but also the effect if there is one default is less catastrophic in the former case.

Combine these factors with the attractive returns when compared to similarly rated corporate debt and there are the key components for keen investor interest. While the current turmoil has tempered interest, in some form or the other, these instruments will likely find favour with investors again.

### 3.7 CDO Valuations

Holders of CDOs monitor the value of their holding by looking at its Mark-to-Market ('MTM'). In theory this is the market value for which a financial instrument could be sold. Effectively, if a CDO is viewed as being a bond, the MTM is the bond price. It is customary in certain derivative markets, where trades may be illiquid, to obtain the MTM using a valuation model, which is calibrated to observable prices. CDOs are illiquid instruments. Hence if an investor wished to sell a CDO tranche, there is unlikely to be an existing market in that tranche. Instead, a bid price can be determined using a valuation model and available market data.

There is striking homogeneity in the valuation of CDOs. Nearly all market participants use the 'Gaussian copula' model to value CDOs. The use of this model for marking to market is virtually mandatory because the market prices that are observable are quoted in terms of a Gaussian copula parameter, the 'implied correlation'. Copula models are among the most complex in financial mathematics.

Receiving timely and accurate valuations is a part of the after sales service for investors as many institutions have a legal or regulatory requirement to accurately value assets on a timely basis. Some desire on-going stress testing to monitor the robustness of the structure. Others will look to manage any likely or actual deterioration of their investment. This can only be done if the right analysis tools are available. As is described above, valuing CDOs is difficult and few investors have developed their own analysis and valuation capabilities – there is still a high degree of reliance on information that comes from the Arranger.

#### 3.71 Hedging CDO investments

A CDO investor bears some risk from each credit in the CDO. In general, if the credit spread of a credit increases, the CDO value will decrease. Further if a credit defaults, the CDO value will decrease. The magnitude of the changes in CDO value will be greatest for junior tranches.

It is possible to quantify the size of spread and default exposure. In addition, it has become market practice to hedge undesired spread or default exposure by buying protection on the relevant credit using a default swap written on that credit. In this way, experienced CDO investors can micro-manage the risk profile of their investment and hedge the effect of an obligor's creditworthiness deteriorating. As market rates move and particularly as a credit's spread changes, so the size of the hedge will change. It is this varying hedge notional that is referred to as the "Delta" and hedging it is of course "Delta Hedging".

Many CDOs have asset-backed securities (ABS) as collateral, normally low or medium risk notes whose exposure derives, like a CDO, from a large number of individual risks, such as credit card loans or mortgages. Often there is a degree of credit subordination, which provides additional protection to the investor. It is very difficult to directly hedge ABS exposure in a CDO with CDSs because:

- The ABS risk is generated by a large number of individual risks, i.e. is not a single risk like a bond.
- The ABS risk is derived from illiquid sources of risk, for example, illiquid loans, mortgages, or credit card loans. CDSs do not reference such risks.

These unhedged risks have played a major role in recent events. We shall return to this issue in section 5.

### 3.8 The role of the Rating Agencies

The Ratings Agencies are an essential part of the *Originate, Rate and Relocate* banking model. Packaging a large number of idiosyncratic credit risks into a CDO makes it very hard for investors to understand all the components of the credit risk. But it is also less important for them to do so if the portfolio has been well constructed to deliver a diversification of the risks. The equity market analogy is that many investors happily buy the *Euro Stoxx 50* index to obtain exposure to “Blue Chip” European corporates, without knowing the details of every company in the index. To obtain diversification, these packages were necessarily elaborate. To give investors assurance of the diversification characteristics of these packages, banks needed them by an independent and reputable third party - the credit rating agencies. The three main agencies, Moody’s, Standard and Poor’s, and Fitch, offered this service, and they benefited significantly from the expansion of business in this area. Ratings became a growth business.

As a first step in rating a CDO, the Rating Agency evaluates the Arranger and makes some qualitative assessment of their infrastructure, experience and operations and a quantitative analysis of historical performance in related products and markets. Stage two involves a review of the proposed portfolio guidelines and investment policies in order to determine the level of diversification and the CDO’s exposure to various risks. In stage three, the Rating Agency might review the proposed structure and run numerous cash flow stress scenarios to determine if the subordination levels and priority of cash flows are sufficient to meet the requested ratings.

The objective of this third stage in the rating is to test a CDO’s resilience to differing timing and distribution of defaults. The Rating Agency would look at potential issuer concentrations to test the structure’s ability to withstand simultaneous defaults at any time. Recovery assumptions would be applied to the results of each test to arrive at a loss number. The goal is to ascertain whether the losses can be supported by subordination beneath the tranche that is being analysed.

This process might have worked better if there was greater independence in the creation of the packages and their rating: if banks created packages blind to the rating agencies *modus operandi* and the rating agencies independently considered the credit risk of the package. This is not the case. Not because of some conspiracy between bankers and rating agencies, but as a result of disclosure rules on rating agencies in the US that many in Europe would like to adopt. In the spirit of transparency that these rules try to achieve, credit rating agencies gave banks computer application software (applets) which enabled them to input a package of debt instruments and see what rating that package would likely acquire and to see how the rating would likely change if the package was adjusted in certain ways.

Banks could now increase their profitability by packaging intrinsically high credit risks into something the rating agencies considered to be a lower credit risk - the packages were “built to rating”. For example, an investor may request a single ‘A’ rated investment with two rating agencies exposed to a pool of European Investment Grade debt but with no exposure to say the financial sector. Using the functionality supplied by the Rating Agencies, the optimal portfolio can be easily identified.

It is noteworthy that while structured finance initially offered the potential of tailored and diverse solutions, the rating process just described, developed in the name of transparency and standardisation, is an important force of homogenisation in the selection and valuation of portfolios.

Packages with the same rating in the same sectors began to look more alike. Consequently, if one package were to suffer an unforeseen credit loss, requiring investors owning that package to act in some way, such as seeking extra collateral or restructuring the package, many investors would be doing similar things at the same time with the same set of assets. This example highlights the need to be more circumspect and less fundamentalist about transparency and standardisation. In general, the more transparency the better for reasons of investor protection. But all transparency, all the time, may not be good for liquidity.

For many investors this “desktop” or “shadow” rating is sufficient for their internal approval; for others, once the portfolio and deal structure is agreed on then a formal rating is requested though the outcome is a foregone conclusion. Clearly the rating agency is rewarded for only the latter activity. It is important to appreciate that the products are created to meet the rating agency minimum rating requirements plus a buffer to prevent immediate downgrades. The arranger is able to tinker with the deal structure in order to maximise the yield for a given rating requirement. Contrast this with the corporate rating process where the borrower has far less flexibility to influence the rating.

Just as the rating of a new deal is somewhat mechanised, so is its re-rating. As the ratings of the underlying portfolio change, a CDO tranche can be shadow re-rated and where substitutions are permitted, the portfolio composition can be changed to maintain a desired rating. This is important where the credibility of the deal is at stake if one or more tranches are down-graded, or where the investor is legally required to sell any investments with a rating below some minimum threshold (often BBB-).

At a certain point in the process of asset deterioration (due to credit events, down-grades or repeated substitutions of deteriorating credits), a tranche or tranches will be downgraded. There is no formal link between credit valuations and credit ratings. A decline in credit values can affect ratings when forced sales due to falling asset values cause economic losses that deplete reserves or subordination that is crucial to a tranche’s rating. In recent months we have also seen rating agencies responding to the reduction in credit values by reassessing their original ratings.

#### 4. THE NEW BANKING MODEL: ORIGINATE, RATE AND RELOCATE

Regulatory incentives played an important role in the evolution of the 2007 credit crunch. In early 2007, according to the regulatory-prescribed models of their “riskiness”, banks had a safe buffer above their capital requirements<sup>(10)</sup>. In some systemically important banks, this has since diminished dramatically<sup>(11)</sup>. One of the recent puzzles of banking was the contrast between the risky activities they were increasingly associated with, such as prime-brokerage and credit derivatives, and the increasingly healthy ratio of their regulatory capital to risk that they reported. Banking appeared riskier, but capital ratios declared them safe. In the run up to the credit crunch, this apparent safety encouraged banks to do more of the same: to originate more debt with the intention of relocating it. It also made regulators generally comfortable that they were doing so.

Many bank regulators portrayed the rapid growth of securitisation as a welcome way of bankers spreading risks more evenly<sup>(12)</sup>. Regulatory-prescribed risk models, such as those embedded in the CRD, not only failed to provide an early warning signal, they signalled the all clear. Moreover, they contributed to the homogenizing of financial participants behaviour that significantly worsened the crisis.

Moreover, recent experience casts doubt on the efficacy of markets as a means of “disciplining” financial institutions. Market discipline is a critical component of pillar three of Basel 2. But prior to the collapse of Northern Rock, the UK stock market “rewarded” its management and praised its risk management strategy<sup>(13)</sup>. Elsewhere any bank with a high degree of capital that was not showing a competitive growth in earnings would have been considered by stock markets to be wasting shareholders capital. They would have paid a stock market penalty that, through share-ownership incentives, would have hit the pockets of their management. This was what Chuck Prince, then CEO of Citigroup was intimating when he commented, notoriously, on July 10, 2007, “When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you’ve got to get up and dance. We’re still dancing”. Just as Mr. Prince was taking time out from dancing to make his comments, the music stopped<sup>(14)</sup>.

While the music was playing, banks were incentivised by bank regulation to earn fees for originating debt and for relocating the debt elsewhere. As a result of capital adequacy requirements the cost of keeping a loan on the balance sheet made banks uncompetitive providers of capital to the most credit worthy borrowers, especially when liquidity was high, non-banks were providing cheap consumer debt (e.g. auto loans) and the bank’s best clients could go straight to the capital markets.

It is often said that investors were to blame for not knowing what they were buying, and more investor knowledge, transparency and disclosure - the perennial response to all crises - will solve the problem.

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<sup>10</sup> At the end of 2006, the ratio of regulatory capital to risk-weighted assets at the end of 2006 was 13% in the US, 12.9% in the UK, 12.2% in Germany, 10.7% in Italy, significantly above the 8.0% minimum.

<sup>11</sup> In the third quarter of 2007, Citigroup reported that its Tier 1 capital fell below its 7.5% target, below the 8.0% standard of Basel 1 and close to its 6.0% regulatory minimum.

<sup>12</sup> For example, as late as November 23, 2007, Mr. Patrick Neary, Chief Executive of the Irish Financial Services Regulatory Authority said “All of us would probably agree that the spreading of risk via new and sophisticated financial techniques and instruments is, in principle, positive for the financial system, insofar as it reduces the likelihood that such risk would be concentrated in one or more financial institutions”.

<sup>13</sup> A little over 12 months before its collapse, on 31 March 2006, Northern Rock’s shares hit a price-earnings ratio high of 17.78, significantly ahead of its peer group which averaged a price-earnings ratio of round 11.5 in 2006.

<sup>14</sup> It stopped for Mr. Prince on November 2, 2007 when he was released from his position of CEO of Citibank.

To an extent, this reflects a misunderstanding of the nature of the market for securitized bank loans and other debt instruments. It is a market where investors, almost by definition, know less detail than normal of the instruments they own – as we discussed in section 3.8 on Rating Agencies.

A stylistic characterization of modern banking is that borrowers who can go directly to investors do so, as it is cheaper. Hence the bank loan books of today generally represent borrowers or instruments to which investors do not want direct exposure. The borrower may be small or an infrequent borrower, the borrower's business may be hard for investors to understand or monitor or maybe the risks are just too great. Loans also carry interest rate and liquidity risks as well as credit risks. To attract investors, banks have to persuade them, with some reasonableness, that a portfolio of idiosyncratic credit risks will yield substantial diversification benefits: lower risk for a given yield (or equivalently, higher yields for a given risk). This is why the ratings agencies are so important to structured finance.

Investors using statistical models to optimize the risk and return of their credit portfolios find these credit instruments highly attractive. They provide an attractive yield, not just because of the diversification of credit risks, but because they offer a liquidity premium – a higher return because they are illiquid, a premium paid on assets that are not liquid and therefore should only attract those investors who do not need liquidity.

Up to two years ago they represented an ideal investment for German Landesbanks who enjoyed a State guarantee that virtually ensured that they would have fail-safe access to liquidity. Landesbanks were therefore incentivised through the guarantee to seek out investments that offered an extra liquidity premium in their choice of assets like private equity and CDOs. However, two years ago the European Commission, in the interests of fostering fairer competition, removed these credit guarantees. This was the right thing to do from a competition perspective and inevitably it introduced a risk to the existing asset holdings of the Landesbanks that had not been there originally – the risk that access to liquidity would be denied. This was a risk that was not in the living memory of the Landesbanks' managements and according to statistical models of the past five years, was a very low risk. At the same time these illiquid credit instruments assets were delivering good returns while the removal of the guarantee was hurting margins. These returns would have been largely lost if the funding for these assets was maturity matched to the asset (i.e. funding ten year assets by raising a ten year loan). Armed with their risk-sensitive models for assurance, the Landesbank's held on.

Other buyers who were incentivised to buy these assets were investors not required to observe capital adequacy or solvency requirements for owning illiquid loans: investors who were acting like banks and insurance companies but without the regulatory requirements. No one was more aware of this than banks themselves and they often organized investors into SIVs that owned the assets and leveraged the funding through short-term debt. Like any bank, SIVs had an inherent liquidity problem in that they were buying illiquid long-term assets using short-term borrowing and so to allay the fears of investors and rating agencies, the banks often provided a liquidity "backstop". According to the bank's risk-sensitive models, measured over a period of calm in the credit markets, the probability of having to employ the backstop was small.

It is interesting to note that under the risk-sensitivity approach of Basel 2 and the CRD, these contingent liabilities would have required the banks to put aside more capital than they did. It is argued by some that this would have tempered their use and is an argument for the CRD. While this appears so from a static perspective it is worth considering the dynamic implications of risk-sensitive provisioning for contingent liabilities.

When liquidity is high and it might be hoped that banks would apply discretion, risk sensitivity models would indicate that these liabilities were not risky and so they would have been acquired with relative ease. When the credit cycle turns, volatility and correlation rises, so risk-sensitive models would indicate that these liabilities had become extremely risky, requiring banks to set aside substantial amounts of capital at a time when such capital was in scarce supply. This pushes up money market rates and when capital is hard to find, will lead to a firesale of assets to generate liquidity. The static position looks prudent, but the dynamic is dangerous. The dynamic aspects of these risk-sensitive models are discussed further below.

#### **4.1 Risk traders versus risk absorbers**

It is important to note that many of the investors, who hold assets in SIVs or as an investment in CDOs/CDS, are set up as “traders”. Their risk management systems assume that if they cannot fund the assets for whatever reason they will be able to sell them. They trade and treat the assets as ratings with yields. They “outsource” the monitoring and understanding of the risks to the rating agencies so they have no independent view of the risks. They are not risk *absorbers*.

A risk absorber needs to have the capacity to take a different view about the risks than the market place. To do this they would not depend on market liquidity and they would have a credit monitoring capacity that was independent of market prices. The stylized characterization of Warren Buffet’s insurance company, Berkshire Hathaway, is a risk absorber: prepared to buy assets that have been beaten down by the market place in calculated anticipation that while they may not appreciate shortly, they will do so over a time horizon shorter than his liabilities.

Investors with long-term liabilities like pensions funds and insurance companies are natural risk absorbers. Their ability to be risk absorbers however has been curtailed by regulations that require or encourage pension funds and insurance companies to mark-to-market their assets and respond to short-term changes in asset prices.

#### **4.2 Risk sensitive models and liquidity**

Before considering risk models in greater detail, it is important to emphasise that the *originate, rate and re-locate* model is a direct by-product of the incentives facing financial institutions. It is arguable that greater individual and institutional responsibility should have tempered the impact of these incentives. But it is unlikely that there will be any lasting change unless incentives are changed. Regulatory requirements encourage the banks to originate, but relocate loans to investors that do not have those regulatory obligations. The direction of this flow of credit risks, from banks to investors, is not always wrong from a systemic risk perspective. But the size and concentration of the flow to risk traders has proved destabilizing. This is due in part to risk-sensitive models that, in the dynamic of the crisis, turned out to be part of the problem rather than of the solution.

The statistical risk models used by banks, credit rating agencies and investors have differences, but at their core, lies the modern portfolio theory developed by Harry Markovitz and further extended by Robert Merton. That theory presumes that instruments have inherent risk and return characteristics. There is a frontier of portfolios of instruments that maximize returns for a given average level of risk and the one that the investor picks relates to their own investor risk aversion. Risk and return of instruments and portfolios of instruments are not fixed points but are distributions. Using a model that optimises this mean-variance relationship, an investor can estimate the probability of a loss of a specific cash level. Equivalently, an investor can infer the loss they would suffer at a given probability level. For example an investor may say of his portfolio, based on past distributions of risk and correlation, that there is a 2.0% probability that his loss tomorrow is greater than Euro1,000,000.



This is referred to as a DEAR limit (daily earnings at risk). Risk management using DEAR limits was developed by banks in the late 1980s<sup>15</sup>).

Risk is a subject that generates much concern, uncertainty and confusion. It is a subject where people seek confidence and convention. These risk-sensitive models have become the convention for three broad reasons. First, they had academic credibility. The models were based on the work of the “enNobeled” of finance like Markovitz (1952), Merton (1973) and William Sharpe (Sharpe, 1963). Second, regulators had approved their specific use for the evaluation of market risks held by banks in the 1996 amendment to the Basel Accord (Basel 1). Today the approach to modelling risks based on distributions of past risk is the lynch pin of the risk-sensitive approach to risk in Basel 2 and the CRD. Third, “everybody” uses these models. Uncertainty leads to herding. The fact that many are using a similar risk model gives confidence to many more to follow suit. Paradoxically, their widespread use lies at the heart of why these models fail (see Persaud, 2000).

The modern statistical versions of the Markovitz and Merton models were developed to help banks measure their private risks. Banks are commonly assumed to have short-term liabilities. Consequently, risk was defined as the probability of a loss occurring “tomorrow” based on past distribution of volatility and correlations.

If volatility or correlation rises, increasing the probability of a loss above the bank’s DEAR limit, they reduce their exposure to return within their DEAR limit. Implicit in the drawing of inference from the past distribution of volatility and correlation to tomorrow is the assumption of statistical independence. Specifically, the process of selling risk return into the DEAR limit, or the period in which DEAR limits are hit, are assumed to be independent of the previously observed volatilities and correlations.

#### **4.21 Risk models and strategic behaviour**

This made sense in the 1950s when Markovitz was developing modern portfolio theory, and even in the 1970s when Merton was developing the Merton model. In those days investors were “segmented” behind country and regulatory borders. The supply of capital was relatively inelastic. Information was sparse. Investment management was less professionalised and computing power limited. Cross-border financial flows were a tiny fraction of the levels today. For example, the stock of international bank lending rose from \$265bn in 1975, to \$42000bn twenty years later (Eatwell, 1997, pp.4-5). If a single, small, investor were to construct a portfolio that maximized their expected return for a given level of short-term risk based on past observations, they could reasonably assume statistical independence. They could reasonably expect that measures of volatility, correlation, and returns reflected inherent characteristics. Risk models today are essentially the same, but the world has changed in such a way to undermine the assumptions that make these models work. These models systematically underestimate risk in “quiet” times and overestimate risk in “stressed” times.

Today’s world is flat in terms of information and investment flows. When an asset or portfolio of assets offers a higher yield than its historic risk based on databases of five or more years, investors are aware of it globally and they begin to add these assets to their portfolios. The response of global capital changes the characteristic of the asset into an increasingly over-priced instrument that is vulnerable to the herd exiting.

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<sup>15</sup> J. P. Morgan was one of the first banks to develop a bank-wide “daily-earnings-at-risk” model under Till Guilderman in 1987. J. P. Morgan’s approach was seen by many at the time as industry “best-practice” and later a division selling market risk-management know how called Riskmetrics was spun out.

This vulnerability is not picked up in the five-year average of short-term volatility until the herd has assembled and there is a bump in the night<sup>16</sup>). When the price volatility of an asset rises following some bump, and the DEAR limits of the herd of investors invested in the asset are in danger of being breached, the investors try to reduce their risk exposures. However, because they are all doing so at the same time, and the wider set of instruments that looked attractive on a risk-return basis to one investor looked so to all investors, investors are selling a similar set of instruments. Correlation as well as volatility rises further, which causes the DEAR limits to be hit again and forces the holders to sell more. This dangerous circularity has been described as a liquidity black hole (Persaud, 2003, 2004).

The essential problem with the traditional models is that in assuming statistical independence, they assume away the strategic behaviour that is the hallmark of investing today. They assume that when an individual investor uses a readily available database of market prices and a common risk model to identify markets with better risk return characteristics, they are the only ones to react to what they see.

And when investors see risk-return characteristics changing and want to reduce risk back below some level, that they are the only ones doing so. In today's more fluid markets, where the supply curve of capital is almost horizontal, the observation of statistical characteristics triggers an investor response that is large enough - over time - to change these statistical characteristics. The implication is that, at a time of stress, the probability distribution of future price is unstable. This instability cannot be addressed by simply assuming fatter tails of the historic distribution. A good analogy is that Markovitz/Merton derived risk models are like seat belts in a car that lock when you are at standstill and unlock when you start moving. Adjusting the inertia settings will not help.

The essence of a liquidity black hole is that in normal times, price declines bring out buyers looking for bargains. In a Liquidity Black Hole, falling prices, by triggering some risk limit, leads to more sellers, more price declines and more selling. There is growing evidence for this risk-model induced liquidity crisis (see Cohen and Shin, 2003).

Risk models attract a herd of investors, and then use adverse movements in price measures to signal to the herd that it is time to reduce risk by "hitting" the same prices. This is why when a bank or fund is enveloped by a Liquidity Black Hole a harried risk manager is often seen explaining that according to the risk model it was a "once in a thousand year" event. Those who recall the 1987 problem of "portfolio insurance", the 1994/95 Tequila crisis, the 1997 Asian Financial Crisis, the 1998 LTCM debacle and today's credit crunch, would observe that these "once in a thousand year events" occur every five years or so.

The problem is not caused solely by an overly static measurement of risk, but the mechanistic reaction to these faulty measures of risk. In the case of banks and insurance companies, these mechanistic rules to "sell risk when it appears high" are often part of regulation. Even where they are not part of formal regulation, mechanistic rules are used by a great many other investors, in part to reassure and signal to regulators and clients that they are applying commonly accepted risk management practices. While it would be impossible to put the genie back in the bottle and request that market participants do not look at mark-to-market measures or market-price measures of risk, the systemically dangerous degree of responsiveness of market participants to contemporaneous measures of risk could be lowered.

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<sup>16</sup> The *Financial Times* (August 27<sup>th</sup> 2005) described this as the *Persaud Paradox*: "the observation of safety creates risk and the observation of risk or safety".

For example, many prudential regulations require investors to only hold assets of a minimum credit rating. This leads to the mechanistic selling of assets that have been downgraded below this level even though the price of these assets has already discounted the news that subsequently led to the downgrading. The herd selling leads to a disproportionate response to the rating change causing a valuation hit in portfolios that triggers further selling of risk. It has been suggested that it would be better to require that investors should not *purchase* assets below a certain credit rating and give the managers some freedom as to whether to hold on to the assets that have been downgraded or when to sell them.

Risk modelling in this form also amplifies the credit cycle with potentially systemic implications. In economic good times when credit defaults and market volatility is low, historic measures of risk are low, encouraging more risk-taking.

Continuing along the economic up cycle, historic price measures suggest that this increased risk taking is “safe” and emboldens further risk taking. Risk taking grows ever more aggressive until the peak of the credit cycle when some bump causes the herd to rush for the exit at the same time, forcing up volatility and correlation measures. Risk models encourage more risk taking at the height of the boom when we would rather greater circumspection and discourage lending as the boom collapses, just when the economy would benefit from some forbearance. Although the primary purpose of banking regulation should be to avoid the undesirable systemic implications just discussed, Basel 2 and the CRD places these pro-cyclical risk models at the heart of capital adequacy requirements. It is not surprising that despite substantial investment in risk management using these models that they have failed to protect the financial system. Financial market crises occur as a result of market failure to fully recognize risks. If the markets fully anticipated risks they would not materialize. But if market pricing is the problem, using risk models that rely on market prices is very unlikely to prove a defence against market failure. Non-market price measures of risk, such as measures of concentration or measures of the economic cycle, are more likely to anticipate a market failure than are market prices.

What is surprising is that these models of private risk should have been adopted as the measure of choice by regulators. The models are measuring the sensitivity of *individual* bank profitability to risks. The issue regulators should be focused on is the sensitivity of *systemic* risks to banks pursuing their individual profitability. This is clearly not the same thing and where the use of these faulty models of individual risks generates systemic selling or buying as described above, it is almost the opposite of how regulators should be tempering private behaviour. The prescriptive reliance on these market-price, risk-sensitivity models at the heart of the CRD appears tangential to the objective of regulation at best, and dangerous at worse.

### **4.3 Liquidity**

As noted above, and contrary to common belief, the liquidity of a market today rests not so much on its size (as measured by market capitalization or turnover) but in the diversity of its participants. It is easier for observers to see this distinction in the midst of a crisis than during the quiet time before a crisis when liquidity appears high and capitalization is galloping ahead. The global corporate credit market is hardly small<sup>(17)</sup>.

In many markets there are many different types of market participants like hedge funds or pension funds and within each type there are many different investment strategies. But diversity is often richer in appearance than in the reality of behaviour.

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<sup>17</sup> The non-Government bond market makes up almost 50% of daily turnover of fixed-income instruments.

A key measure of the critical degree of diversity required for liquid markets is how differently market participants respond at times of stress to short-term price declines. A market where, for whatever reason, falling prices trigger selling by most players and generate few buyers, is one that may be large and appear liquid in quiet times, but will be fragile and illiquid in stressful times. This is a stylized description of what has occurred in the global credit markets.

Many investors have long-term liabilities that do not require sensitivity to daily market moves. Examples would be pension funds, insurance companies, Sovereign Wealth Funds (SWFs) or any other investor where funding or liabilities are long-term. These investors can earn a liquidity premium versus other investors who require short-term liquidity. From a systemic point of view these investors act as a liquidity absorber during time of stress.

For example, if the Abu Dhabi Investment Authority (ADIA) were constrained by a tight DEAR limit, it would not have been able to purchase 4.9% of Citibank shares in November 2007, just as the market was anticipating the bank to be forced to raise fresh capital. But ADIA is a SWF, investing for when Abu Dhabi runs out of oil in several decades. On this long view it was buying Citi shares at a bargain basement price. ADIA's presence and behaviour countered the likelihood of a steep price fall in Citi shares that could have developed into a vicious cycle. European pension funds and insurance companies should have been vying with ADIA to buy Citi shares. These investors would be ideal candidates for holding illiquid but good credit quality packages of debt instruments, or for buying them from investors who are forced to sell them during a time of stress. But they cannot do so if they are required to behave in the same way as liquidity-hungry investors as a result of inappropriately applied mark-to-market accounting of assets, Solvency II<sup>(18)</sup>, or risk-management fashion.

Investors who have short-term funding, or are forced to follow short-term solvency or stop-loss rules, or who intended to trade an asset and so are not incentivised to understand it sufficiently to hold on to losing positions – will be forced to sell assets when they fall sharply in price. Indeed, they are incentivised to try to be the first to sell assets before other investors do. Liquidity disappears in this rush for the exit. These liquidity-hungry investors act not as risk absorbers, but risk amplifiers.

Many regulators used to argue that the transfer of risk from one bank's balance sheet to several investors was a desirable spreading of risk. But what matters is not the number or name of those that risk is transferred to, but their behaviour. The transfer of risk from banks was a transfer from a risk *absorber* to entities that acted as risk *traders or amplifiers*. This did not spread risk, it concentrated it. Supervisors ignored or misunderstood the distinction between risk traders and risk absorbers, and the need for heterogeneity.

It may appear from this analysis that the most liquid markets are those where there are only risk absorbers. But an efficient market requires both risk absorbers and risk traders. This is because there are at least two types of liquidity and different players serve different type (see Lagana *et al.* 2006). Risk absorbers improve systemic liquidity – the liquidity available under times of market stress. A world full of Warren Buffets would suffer fewer liquidity crises.

But there is another kind of liquidity: search liquidity. The cost and time required to find securities that don't trade often during less stressful times. Search liquidity is important for the efficiency of markets in the quiet times, that is, most of the time.

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<sup>18</sup> Solvency II is a fundamental review of the capital adequacy regime for the EU insurance industry. It mirrors Basel 2 and aims to establish a revised set of EU-wide capital requirements and risk management standards to replace Solvency I.

This type of liquidity is best served by risk traders, trading assets on a continuous basis, repeatedly turning them over and checking their prices. Markets require a balance between risk traders and risk absorbers and regulators must ensure that their regulation does not cut across this balance and does not artificially suppress one type of risk taker for the other. In the recent past, regulators focused on supporting risk traders at the expense of risk absorbers. This is a little odd, given that financial markets have demonstrated that, via innovation, they can support search liquidity themselves, while regulators are the key defence against a worsening of systemic liquidity.

## **5. THE EVENTS OF 2007**

The events leading up to and during the credit crisis were a complicated combination of real losses and distressed valuations causing and being caused by liquidity problems for hedge funds, SIVs and banks. An understanding of the full sequence of events starts where the real losses started - the sub-prime mortgage market.

### **5.1 Sub-prime mortgages**

The process of originating, rating and relocating mortgages is well established, especially in the U.S. market where it has long been accepted that mortgages could be bundled together and sold to specialist mortgage companies<sup>(19)</sup>. These companies raise the necessary funding from an array of investors who are given the choice of participating in the risk of the mortgage pool at a junior, mezzanine or senior level. There are a number of classifications, credit scores and other underwriting tests that provide the investors with some comfort as to the risk of the pool that they are exposed to. It is beyond the scope of this paper to describe the securitisation of mortgages in detail. There are however two important features that help explain the extensive confusion surrounding the size and extent of losses in the sub-prime sector.

#### **5.11 Recovery of losses by the mortgage servicer**

Although mortgages may be moved into specialist financing companies issuing mortgage backed securities (MBSs) to allow the risk to be spread far and wide, the actual management of the mortgage relationship with the borrower is the responsibility of mortgage servicing companies. These companies are required to make payments to the MBS issuer that would normally be covered by back-to-back payments from the borrower. If the borrower misses a payment then the servicer pursues payment culminating, in the worst case, in a foreclosure on the mortgage and taking possession of the house to sell it and repay the loan. Normally the servicer can only reclaim losses from the MBS company when they have reached the last legal remedy of foreclosure. If for some reason foreclosure cannot happen, due perhaps to the kind of government intervention recently announced by the Bush administration that prohibits or discourages foreclosure to prevent a social crisis of thousand of dispossessed home-owners, then the servicer will be making cash payments to the MBS which are not be covered by the borrower. Even without the intervention by the state, it is easy to imagine a very protracted process before the servicer can declare legal foreclosure and reclaim losses from the MBS. Given the geographic concentration of losses it is likely that the court process will be another obstacle – it will not be equipped to deal with hundreds or even thousands of such claims. As a result there is a bottleneck in the foreclosure process, which adds considerable confusion to the process of estimating actual losses in the sub-prime mortgage space.

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<sup>19</sup> The longer acceptance in the United States relates less to market depth than commonly thought and more to government intervention in the form of the establishment of the Federal National Mortgage Association (Fannie Mae) on February 10 1938, by the Roosevelt Administration.

## 5.12 Underwriting

A second problem relates to the actual underwriting process. A number of the tests that allow a mortgage to be placed in an MBS are enforced by the local lender. Checking the credit scores of the borrowers, checking that the borrowers actually live in the house that is to be mortgaged and ensuring that the borrower makes the first few mortgage payments are all open to abuse. Feedback from those close to the industry suggests that there has been fraudulent activity in this process: the credit score of one borrower might be represented as being the average credit score of a borrowing couple (when in fact the other borrower has a poor score); checks on whether a property is the borrower's primary residence where poor or non-existence; and, it was not unusual for the mortgage arranger to offer to make the first mortgage payment as a "sweetener" for the deal. The scale of these true transgressions will be revealed as investigations proceed, but there is some certainty that many mortgages would never have been transferred into MBSs if the underwriting rules had been rigidly enforced.

By the time these pools of sub-prime mortgages had been financed by different risks tranches and some of these tranches had been placed in CDOs to be further tranced, it should come as no surprise to discover that the CDO investors had little clue as to the risk and therefore value of their positions. Cash flows are uncertain due to uncertainties at the servicer level and the average risk of the portfolio is uncertain due to possible flaws in the underwriting process.

The credit modelling tools used by the mortgage markets may have been adequate for valuing individual mortgage backed tranches in normal market conditions but proved ineffective (if used at all) to revalue CDO tranches that were exposed to mortgage backed tranches in distressed market conditions. To add to the confusion it is likely that many CDO investors (i) did not know whether they were exposed to the MBS sector and (ii) even if they knew of MBS positions in the portfolio didn't know the quality of such positions.

It is easy to blame those who *originated* the mortgages for being sloppy and maybe fraudulent in the underwriting process, those who packaged and *rated* the pools of mortgages for not performing better due diligence, and those who *relocated* the securities for being irresponsible in their assessment of this risk. However, it is hard to point the finger of blame at one specific group over another as opposed to all of those involved in the process. Everybody was motivated by the rewards - from the commission for originating a mortgage right through to the higher yields paid to end investors. Those involved early in the chain were never going to bear the risk, those later in the chain didn't know what the risk was. The former were maybe negligent in their regard for the latter, the latter were maybe negligent in not questioning the seemingly endless supply of high yielding low risk product from the former. Arguable the one group in a position to lift up their head from the sand and observe and question the bigger picture were supervisors and the rating agencies. Supervisors were negligent, first in assuming that this by-product of risk-sensitivity was only for the good, and for not being more questioning of their approach to risk management when the growth of the sector exceeded all norms

## 5.13 Investor impact

Uncertainty about the quality of instruments, the usefulness of risk models and the veracity of the rating agencies, led to a significant downward revaluation of all CDO tranches with little distinction between underlying portfolio asset mix. Even those deals with no sub-prime risk were marked down. This had the following impact on different types of investors:

*Hedge Funds:* for the funds that were long CDO tranches the revaluation resulted in margin calls. For some funds the margin calls exceeded available collateral and the CDOs were forced to de-leverage. This could only be achieved by actually selling or terminating the CDO positions that the market was struggling to value. Not surprisingly the termination values were poor reflecting the markets reluctance to take on tranching credit risk. Some hedge funds closed<sup>(20)</sup>, but the problems were more limited than many expected.

*SIVs:* it was well known that SIVs invested in the AAA tranches of CDOs and hence when such tranches started being re-valued at lower levels there was an increased degree of nervousness in the asset-backed commercial paper market. Supplies of liquidity slowed, forcing some SIVs to liquidate parts of their holdings. This added to the downward pressure on asset prices and was compounded by the problems being faced by parts of the hedge fund industry.

*Mark-to-market investor:* most financial institutions that hold CDO investments are required to mark their positions to market. The significant revaluations that started to appear as the liquidations in the Hedge Fund and SIV markets gained momentum, caused material mark-to-market losses for many investors. In some cases the losses triggered an informal decision or a formal requirement to sell. This was particularly frustrating where the investment was taken on with a hold-to-maturity mentality, there was no investment requirement for liquidity and the new value was likely to be an over-reaction to the new risks.

*Nervous investor:* For most of 2007 the financial press has covered the structured credit market with a level of detail never seen in the market's 13-year history. The coverage during the crisis was very detailed but frequently misleading. For example, the highest rated CDO tranches – the 'AAA' tranches – were often referred to as one group with little attempt to distinguish between the different underlying pools of risk. This may have contributed to all AAA tranches being re-valued at much lower prices even where the underlying portfolio was 100% investment grade corporate risk.

*Hold-to-maturity investor:* The group of investors who provided much needed stability during the period of CDO revaluation and liquidation were the risk absorbers, investors who were not affected by liquidity needs, either did not mark their positions to market or were able to absorb significant mark-to-market movements, and who were sophisticated enough to assess the true meaning of the market's revaluations.

The net result is that investors are now generally nervous about CDOs in general. As of the end of 2007 a number of large investors have indicated that they will reduce or even end their involvement in the structured credit markets. Others are making noises both publicly and in private about taken legal action against the Arrangers and possibly the Rating Agencies. However, a growing minority see the current market conditions as an opportunity and are positioning themselves accordingly.

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<sup>20</sup> The hedge fund arm of Bear Stearns, a New York-based investment bank, was one of the worse casualties of the crisis. By the end of 2007 it was forced to close three funds with assets that at one time held approximately \$5bn after they suffered losses as high as 39%.



*Non-credit market participants:* Unsurprisingly the fall in credit prices and resulting rise in the cost of credit has spurred a wider uncertainty surrounding economic prospects that has impacted financial markets more generally. Indeed, some of the first high-profile casualties of the credit crunch were equity market participants, in particular private equity firms, for which the rising cost of credit directly impacted the profitability and financing of existing and prospective investments<sup>(21)</sup>. The increased volatility and correlation of asset markets also led to substantial losses by model-driven equity funds<sup>(22)</sup>.

## **5.2 Impact on the banks**

The banks that were originating loans to risky borrowers (so called “Leveraged Loans”) during 2006 and 2007 were faced with an exceptionally challenging pricing environment. Due to the imbalance between supply of and demand for fixed income product, assets prices were artificially high with risk premium more resembling liquidity premiums and the differential between assets prices within differing rating categories being very small. It reached a stage where the ability of the banks to be competitive with pricing was severely constrained. As an alternative to reducing the risk premium to completely unrealistic levels, the banks decided to relax the legal covenants instead. This had the effect of the banks not having such a tight control over borrowers: restrictions on controls of the balance sheet were loosened and the mechanisms for spotting corporate problems were less robust.

The loosening of loan covenants became the new competitive edge and started a market for so-called “cov-lite” loans. Market commentators were generally critical of this development and talked of a growing tidal wave of credit problems in years to come. Nevertheless, the CDO market was running well, and the demand for all debt products including leveraged loans was robust. Not only were large volumes of cov-lite loans issued but also the banks were comfortable to hold them on balance sheet pending the next available CDO coming off the production line.

Consequently, when liquidity dried up the impact on the banks resembled a perfect storm, given their involvement in so many areas of the *originate, rate, relocate* process. Assets due to be securitised unexpectedly stayed on balance sheet, unsold CDO risk positions fell in value, some collateralised credit lines failed, SIV backstops were called and some SIV and CDO deals had to be brought back on balance sheet.

### **5.21 Warehousing of assets for CDOs**

By mid 2007 the CDO machine was in full swing with a broad range of asset classes being securitised. In order to speed up the process it was common for banks to “warehouse” assets that were destined for a CDO. Since there was a reasonable certainty that any debt held in this way was only going to be on balance sheet for a short period of time, it was possible that the attention paid to hold limits or underwriting standards was less than it would have been if the debt was destined to be held for a longer period of time.

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<sup>21</sup> For example, discussions concerning the \$1.8bn sale of GE’s PHH, a mortgage lending and fleet car management company, to Blackstone, the private equity firm, appear to have been broken off at the end of 2007 because Blackstone was unable to arrange the debt structure they had wanted.

<sup>22</sup> In September 2007 the headlines moved away from credit problems for a while to document the 22% loss in August of Goldman Sach’s Global Alpha Hedge Fund, a quantitative equity fund. Risk managers explained that the loss was a result of a “once-in-a-millenia” event according to their risk models.

The warehousing of Leveraged Loans proved to be particularly hazardous when the credit crunch started. Not only were the issuers of such loans considered risky due to their rating being the wrong side of a “flight to quality” threshold; but because of their cov-lite label the traditional takers of such loans were less keen to invest. Many banks, perhaps emboldened by the previous capacity of the CDO repackaging machine, held considerable overall positions and substantial exposures to individual borrowers. Once it became apparent that these loans were not moving as fast as expected, it was necessary to declare holdings and revaluations as part of the defensive steps taken by banks to reassure other banks of balance sheet strength.

### **5.22 A fall in value for unsold positions**

The credit crisis left banks holding two sorts of CDO positions: those that they had always planned to hold – mainly senior positions, and those that they were unable to sell. Both have been or will be written down in value and it is likely that the former will create the largest problem because of the sheer size of senior positions held by banks. A recent media article (*CreditFlux* December 2007 page 4: “Fears grow over ABS CDO arrangers’ exposures to super senior tranches”) reveals that just in the CDO part of the ABS market, the size of super senior tranches of deals done in 2006 and 2007 is close to \$240 billion. It quotes a recent estimate that two-thirds of super senior risk was retained by arrangers, with the rest transferred to monoline insurance companies. Data in the article shows 9 arrangers responsible for more than \$10 billion of super senior tranches each, with one dealer arranging five times that amount. If the research is correct then the holdings are significant even for the largest institutions.

### **5.23 Bringing risk back on balance sheet**

Arrangers in the Structured Credit market have indirect exposure to CDO products due to their involvement with SIVs, Hedge Funds and CDOs themselves.

Most SIVs have a backstop credit facility provided by a bank. As traditional investors in SIV issued commercial paper have backed away, banks have had to step in to provide financing. In a number of cases this has resulted either in banks effectively taking control and consolidating the SIV or in banks voluntarily taking the SIV onto their balance sheet to ease investor concerns.

In the case of hedge funds, where a hedge fund or other leveraged investment fund pursues a structured credit trading strategy, the first loss for the strategy is provided by the fund’s equity investors, but the second loss is provided by the bank acting as swap counterparty. To the extent that mark-to-market requirements exceed the fund’s available collateral, the bank is exposed to that excess and any further credit deterioration.

Finally, aside from the direct exposure that an arranger may have to a CDO, there may be indirect exposure should a situation arise whereby an arranger has to consolidate the assets of a CDO. One example recently discussed in the media (Bloomberg, 26 Nov 2007) is a “reconsideration event” which occurs “when an institution acquires extra interest in an entity”. In this particular case a bank bought \$25 billion of commercial paper sold to finance the CDOs that the bank had arranged. This could result in the off-balance-sheet entities failing the ownership and control test and the bank having, in this case, to consolidate \$41 billion of CDOs.

## 5.24 Accounting changes

The US Financial Accounting Standards Board *Statement 157* became effective for financial statements issued for fiscal years beginning 15<sup>th</sup> November 2007. Financial Accounting Standard (FAS) 157 clarifies the definition of fair value, how to measure fair value and the broader disclosures about fair-value measurements. It is intended to improve financial reporting and provide users of financial statements with better information. A challenge for auditors as they implement FAS 157 will be determining the values of "Level 3" assets which include those that do not trade in active markets or which are unique. Their value may be determined by mathematical models. Pre-crisis CDOs had been treated as "Level 2" assets: those that are not actively traded but have observable inputs that may contribute to a valuation.

According to a recent media article (*CreditFlux* December 2007, page 3: "Dealers cram CDOs into level three") there has been an increase in the use of the Level 3 classification, with company filings from three US broker dealers showing at least a 50% increase in total Level 3 assets from Q1 to Q3 2007. Such a change in classification requires a higher level of disclosure; it also requires companies to take into account what a position would realise if it were sold today. This could force some large write-downs even though the assets have not incurred any actual losses and are unlikely to, given the quality of underlying credit risk<sup>(23)</sup>.

## 5.3 An on-going liquidity and credit crisis

To date, credit and liquidity issues have been tangled up with each other. One way of thinking about this is that CDOs have a credit price – reflecting their credit risks - and a liquidity price – reflecting the price at which the instruments could be sold right away. Investors thought that high credit ratings would make the instruments liquid. But partly as a result of mistrust over the veracity of the ratings, and the congestion of forced sellers described above, whilst the credit price has fallen, the liquidity price has collapsed. At the time of writing the ramifications of the sharp fall in (or, in some cases, total disappearance of) liquidity are still working their way through national and international financial markets. The final impact of these events on financial entities and on the performance of real economies is not yet clear. It is possible that time will change the nature of the crisis as liquidity recovers, but more credit problems are revealed.

What is clear is that allied to the economic cycle, easy financial conditions coupled with innovation have led to financial excess, with the beneficial consequences of credit risk transfer being swamped, at least temporarily, by the painful unwinding of an expansion of credit that was imprudent and sometimes fraudulent. This is a well documented historical pattern, as is made clear in the classic study of *Manias, Panics and Crashes* by Charles Kindleberger (2002). The role of the policymaker is to learn from events, to take the necessary steps to combat past excesses and prevent their repetition, and to develop an institutional framework that is more sensitive to the systemic risks embedded in financial innovation in a market economy – whilst reaping the benefits of that innovation.

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<sup>23</sup> It has been estimated by analysts at Royal Bank of Scotland that "Level 3" write downs could exceed \$100bn and that prior to recent re-capitalisation, the size of level 3 assets held by Morgan Stanley and Goldman Sachs, the bluest of blue chip US investment banks, were 2.5 to 2 times the size of their equity respectively.

## 6. FINANCIAL REGULATION AND CRISIS MANAGEMENT IN THE EU

In charting what lessons might be drawn from recent events, and how resultant measures might be implemented, it is necessary to examine the institutional framework of European Union financial regulation and to identify any gaps that should be addressed to achieve regulatory objectives, including effective crisis management – all in the context of an increasingly integrated European financial market.

EU legislation already plays an important role in influencing the development and operation of EU member state regulatory institutions. The 2007 credit crisis has demonstrated how quickly financial losses can spread across EU member state markets as counterparties in multiple jurisdictions were exposed to high levels of financial risk emanating from outside their jurisdictions. It raises the important question of whether EU legislation is adequate to meet the challenge of complex and integrated EU financial markets.

### 6.1 European financial integration

The wholesale banking markets in Europe have experienced a significant degree of integration, especially following the adoption of the euro. Interest rate differentials have substantially converged in the inter-bank markets. But other financial service sectors, such as investment services and securities brokerage, insurance and most areas of retail banking, remain essentially fragmented within national jurisdictions, while relatively little cross-border activity takes place in the corporate loan and bond issuance market and in retail banking services. (Adam *et al.*, 2002; Barros *et al.*, 2004; ECB 2004). The composition of most investment funds is substantially biased towards home markets (Cabral *et al.*, 2002).

The fragmentation has been attributed to regulatory obstacles, legal barriers, and macroeconomic, social and cultural factors. For example, differences in risk appetite of investors across jurisdictions affect the types of investment products offered, while market imperfections such as information asymmetries often result in major obstacles to the efficient flow of capital across EU member states. EU institutions have sought to reduce these barriers through legal and regulatory reform, but these policy instruments form only part of the solution to achieving integrated EU financial markets. Increased integration in EU financial markets is occurring primarily because of increased convergence in macroeconomic development, market penetration, and growing similarities in the social and cultural traits that influence investors' attitudes toward financial risk. This integration is likely to be reinforced by the implementation of new EU legislation under the auspices of the Lamfalussy process (IIMG, 2007, p.13).

The challenge arising from the increasing integration of European and global financial markets and the recurrence of financial crises, such as the 2007 credit crisis, is how to strike the right institutional balance between EU institutions and member states in the regulation and supervision of financial markets<sup>(24)</sup>. In the EU, most financial regulation is based in the member state where the financial firm is incorporated or has a headquarters. Supervision is based on the principle of home country control in which the supervisor of the jurisdiction where the bank is chartered or incorporated exercises extraterritorial regulatory responsibility over the bank's EU operations.

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<sup>24</sup> "Regulation" refers essentially to rule-making, while "supervision" involves applying the rules and judgement to a specific case. In practice the two activities often overlap and are not so easy to separate, as regulation often involves enforcing rules in specific cases, whilst supervision often implies regulation.

However, when an EU-based banking group has subsidiaries operating in other EU states, the supervision of those subsidiaries is exercised by the host state supervisor of the jurisdictions where the subsidiaries are incorporated.

The regulatory policy incentives of home country regulators are to protect the depositors and creditors of banks based in their home jurisdictions. This works as long as banking activities are largely confined to one country – normally the country where the bank is incorporated and has its home license. It has also worked well for banking groups which have fragmented management structures in which the management of foreign subsidiaries is largely autonomous from the day-to-day management of the parent group, hence allowing the foreign subsidiaries' management to deal independently with host state supervisors.

However, as global financial markets have become increasingly integrated, the structure of banking markets and their management have changed significantly. Large banking groups have been created from a growing number of cross-border bank mergers. As a result, many banking groups today have major operations in multiple jurisdictions where they can pose systemic risk to a host state banking system. In addition, large banks are increasingly dependent on international capital markets for much of their funding. Banking groups are also progressively centralising a number of key functions at the group level. For instance, risk management, liquidity management, funding operations and credit control, are typically exercised at the group level or in specialised affiliates in order to gain economies of scale and synergies in specialist operations. This also has led to the distinction between branches and subsidiaries becoming blurred. For instance, it is no longer the case that a large subsidiary bank operating in one jurisdiction will be allowed to stay in business if its parent company bank defaults or fails in another jurisdiction (at least not for the short-run).

These market changes pose a number of challenges for the existing EU regulatory framework. A financial crisis in Europe is now more likely to have substantial cross-border implications than the financial crises of the past. As discussed below, the EU regulatory response to this potential threat has been only modest with some increase in the responsibilities of home country supervisors, as set out in the Capital Requirements Directive that implements Basel 2 into EU banking law.

## **6.2 Legal and Institutional Framework**

EU legislation already provides a comprehensive set of rules and principles to govern the legal and regulatory framework of financial markets in EU states. The original source of these powers lies with the European Community Treaty (Treaty of Rome as amended) articles 67-73, which requires member states to “progressively abolish between themselves all restrictions on the movement of capital belonging to persons resident in the Member States and any discrimination based on the nationality or on the place of residence of the parties or on the place where such capital is invested.” The Second Banking Directive 1987 adopted the supervisory principle of home country control based on minimum harmonisation of EU regulatory rules (Second Banking Coordination Directive, 89/646/EEC, [1989] OJ L386/1). According to the principle of home country control, regulatory authority over banks that conduct activities through their branches in other member “countries” lies with the competent authorities in the EU/EEA state where the institution's head office is incorporated (<sup>25</sup>).

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<sup>25</sup> See Council Directive 89/299/EEC of the European Parliament and Council of 17 April 1989, OJ 1989 L 124, p. 16; and Council Directive 89/646/EEC of the European Parliament and Council of 15 December 1989 (OJ 1989 L 386, p. 1); Directive 2000/12/EC of the European Parliament and Council of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions, OJ 2000 L 126, p.1. See *Peter Paul and others v. Federal*

According to minimum harmonisation, member states are required to harmonise what are considered to be the essential areas of banking regulation while being free to surpass these essential minimum standards and to maintain higher distinctive regulatory practices in areas not harmonised so long as they are pursuing valid public policy objectives and do not unnecessarily infringe on EC Treaty freedoms <sup>(26)</sup>. The minimum standards to be incorporated in national regulation by all member states were established in directives issued by the EC Council <sup>(27)</sup>. The effective application of the home country principle based on minimum standards and mutual recognition is premised on the pursuit of common regulatory objectives and trust between regulatory authorities.

EC financial services directives have traditionally adopted a functionalist approach to financial regulation by requiring the same type of activity to be subject to the same regulatory rules, even though the activity may be performed by different types of financial institutions (e.g., universal bank or investment bank) <sup>(28)</sup>.

Moreover, EC legislation does not require member states to adopt a particular institutional structure of financial regulation <sup>(29)</sup>. States may use a single regulator for prudential supervision or divide those responsibilities between two or more bodies.

The successful application of home country control depends on each member state according mutual recognition to other states. This generates a competitive process of regulatory practice amongst state regulators that can lead to converging regulatory standards. Mutual recognition based on home country control reaches a common standard more quickly than regulation based on host country rules. For this approach to succeed in establishing efficient standards of regulation across states, it is not necessary to create a supranational regulatory body. The problem in Europe, however, has been that the legal competence of EU state supervisors has primarily focused on home markets, with little attention given to the impact of their actions on the broader European market or other EU host states.

The EU legislative and regulatory framework of home country control based on mutual recognition and minimum standards has accomplished a great deal in promoting the objectives of the EU internal market but has recently come under strain because of growing integration in key areas of European banking and capital markets and increased risk exposures of counterparties located in multiple member states.

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*Republic of Germany*, Judgment of the Court of Justice of the European Communities, Case C-222/02 (12 October 2004)(recognising that member state national authorities had a number of supervisory obligations pursuant to EU law *vis-à-vis* credit institutions and the exercise of those obligations throughout the Community based on the principle of home country control).

<sup>26</sup>See *Caixa-Bank France v. Ministère de l' Economie, des Finances et de l' Industrie*, Judgment of the Court of Justice of the European Communities, C-442/02, (5 October 2004) (invalidating a French legislative prohibition on the payment of interest for 'sight' accounts for a French subsidiary of a holding company based in another EU state because it constituted an unnecessary restriction on freedom of establishment for the holding company, though the French government justified its prohibition on the grounds of consumer protection and promoting medium and long-term savings).

<sup>27</sup> Solvency Ratio Directive 89/647/EEC; Consolidated Supervision Directive 92/30/EEC, [1992] OJ L110/52; Prudential Supervision Directive 95/26 EC, [1995] L168/7; Capital Adequacy Directive 93/6/EEC, [1993] OJ L 141/1 (introduced capital requirements for market risk and extends harmonised solvency supervision to investment firms).

<sup>28</sup> See First Banking Directive (1977), art. 1; Second Banking Directive (1989), art. 1(6).

<sup>29</sup> This has changed somewhat in the securities area, as EU states are now required to establish a single enforcement authority to enforce the Market Abuse Directive and a single listing authority for all issuers to file prospectuses under the Prospectus Directive.

In response to these changes in European financial markets, there has been some institutional consolidation at the EU level through the Lamfalussy process in the areas of banking, securities, and insurance regulation. Furthermore, the European Central Bank and the adoption of the euro have significantly changed the institutional dynamics of regulation of European financial markets.

### **6.21 The Lamfalussy Process and Institutional Consolidation**

The evolution of EU markets to more integrated structures based on liberalisation of capital restrictions and trade in financial services has been facilitated by the growing importance of the euro as a reserve currency and advances in technology that enable market participants to operate more easily in a cross-border environment. The role of EU member state institutions in regulating financial markets has undergone significant changes as well. The EU Financial Services Action Plan (FSAP) has recognised the Lamfalussy four-level framework as essential in achieving the EU Treaty objectives of an open internal market for capital movement and trade in financial services. The Lamfalussy four-level legislative decision-making process now applies to all major financial sectors, including banking, securities, insurance and pension fund management<sup>(30)</sup>.

The three so-called Lamfalussy Level 3 networks comprise the Committee of European Securities Regulators (CESR), the Committee of European Banking Supervisors (CEBS), and the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS). These three committees have begun acting in a regulatory capacity and have been initially successful in expediting the regulatory standard-setting process by making it more flexible and efficient. The successful operation of the regulatory networks depends on cooperation and frequent contacts between member state supervisors. To this end, the Committees have begun a number of initiatives to increase cooperation and convergence; but the changing structures of financial markets necessitates further institutional coordination in the Level 3 committees to address the growing cross-border implications of financial crises and the cross-border activities of large financial groups.

The Lamfalussy programme does not create a legislative competence to supervise financial markets at the European level. Indeed, the original Report of the Committee of Wise Men in 2000 envisioned only two principal functions for the Level 3 committees: 1) technical advice regarding the development of implementing measures, and 2) promotion of consistent implementation of Community legislation and enhancement of convergence in EU supervisory practices.

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<sup>30</sup> Commission Decision 2001/527/EC (6 Jan 2001) (establishing Committee of European Securities Regulators); Commission Decision 2004/5/EC (5 Nov 2003)(establishing Committee of European Banking Supervisors); and Commission Decision 2004/6/EC (establishing Committee of European Insurance and Operational Pensions Supervisors (CEIOPs)). The four levels consist of 1) legislative proposals of high level principles through the traditional EU co-decision process; 2) based on the legislative proposals, EU finance ministers agree to implementing measures for member states; 3) member state regulators make proposals to Level 2 finance ministers regarding the implementing measures and then consult with each other regarding implementation; and 4) national compliance and enforcement. See Lamfalussy Committee, 'The Final Report of the Committee of Wise Men on the Regulation of European Securities Markets' (15 February 2001) Brussels.

It is essentially a regulatory process that relies on existing comitology procedures, in accordance with Article 5 of Council Decision 1999/468/EC establishing the procedures for the exercise of implementing powers conferred on the Commission, to develop EU financial legislation based on proposals from national finance ministers and regulators, in consultation with industry. The early stages of implementation of the Lamfalussy programme ignited some controversy concerning the scope of legislative authority for EU institutions<sup>(31)</sup>.

In its Resolution of February 2002, the European Parliament agreed to endorse the four-level approach for securities on the basis of ‘a solemn declaration’ made by the Commission and a previous a letter by Commissioner Bolkstein that the Parliament’s Economic and Monetary Affairs Committee (EMAC) will be informed in advance of all specific legislative initiatives for securities markets<sup>(32)</sup>.

Later, in its resolution of November 2002, the Parliament called for certain aspects of the Lamfalussy approach to be extended to the oversight and regulation of European banking and insurance sectors ‘subject to a clear commitment on the part of the Council to guarantee a proper institutional balance’<sup>(33)</sup>. Moreover, the Parliament emphasised that ‘[d]emocratic accountability and transparency must be inherent in the Lamfalussy process and its extension’ through the development of implementing measures must respect ‘the interinstitutional balance’ of EC institutions<sup>(34)</sup>. This position was incorporated by Parliament and Council into Directive 2005/1/EC that established a new organisational structure for the Lamfalussy committees for banking, securities, insurance and financial conglomerates<sup>(35)</sup>. The Inter-Institutional Monitoring Group (IIMG) has issued annual reports to monitor the progress of the Lamfalussy programmes and the ongoing work of the networks of the three regulatory committees.

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<sup>31</sup> For instance, the European Union Parliament observed in a 2001 resolution responding to the Lamfalussy Committee’s Final Report (Feb 2001) that the ‘Parliament must always be in a position to exercise in their entirety the prerogatives granted to it by the Treaty, and in particular the parallelism of the European Parliament-Council decision-making process which is found in the codecision procedure must be fully preserved’. See European Union Parliament resolution on the final report of the Committee of Wise Men on the regulation of European securities markets. B5-0173/2001, 16 /PE 301.343.

<sup>32</sup> See Letter from Frits Bolkstein, Member of the European Commission to Christa Randzio-Plath, Chair of the Committee on Economic and Monetary Affairs, European Parliament, Brussels (2<sup>nd</sup> October 2001). In his letter, then-Commissioner Bolkstein promised, *inter alia*, that his office would make ‘a note specifying and explaining the distinction between the essential and non-essential elements and the technical provisions in our draft proposals.’ (p. 1). A number of other undertakings were made to the Parliament including that the Commission would send all draft legislative proposals to EMAC at the same time that they are sent to member states and industry, and that draft implementing measures sent to the European Securities Committee will be also sent simultaneously to EMAC, and that EMAC would have access to confidential documents. Moreover, monthly meetings would take place between EMAC’s secretariat and Commission services (DG MARKT) to exchange all relevant information concerning securities market (p. 3).

<sup>33</sup> See Directive 2005/1/EC (9<sup>th</sup> March 2005), recital para. 8.

<sup>34</sup> See Parliament’s Amendments to Commission’s proposed text for the Directive establishing a new organisational structure for financial services committees. European Parliament legislative resolution on the proposal for a European Parliament and Council Directive amending Council Directives 73/239/EEC, 85/611/EEC, 91675/EEC, 93/6/EEC, and 94/19/EC and Directives 2000/12/EC, 2002/83/EC and 2002/87/EC of the European Parliament and of the Council, in order to establish a new financial services committee organisational structure (COM(2003) 659 – C5-0520/2003-2003/0263(COD)), Amendment 1 Recital 5(a) (new).

<sup>35</sup> Directive 2005/1/EC of the European Parliament and of the Council of 9 March 2005 amending 73/239/EEC, 85/611/EEC, 91675/EEC, 93/6/EEC, and 94/19/EC and Directives 2000/12/EC, 2002/83/EC and 2002/87/EC in order to establish a new organisational structure for financial services committees, recital (6).



Moreover, Parliament's objective to maintain institutional balance at Level 2 has been supported by a 2006 agreement with Council and Commission that contains a new regulatory procedure that increases Parliament's authority to review and to block the adoption of quasi-legislative (comitology) measures (Commission 2007, 4). Parliament's concern with safeguarding democratic accountability and inter-institutional balance in the Lamfalussy process does not detract from its 'opinion that the Lamfalussy procedure is a useful mechanism', and 'welcomes the work of Level 3 committees' to promote convergence of supervisory practices throughout the EU (Parliament 2007, para. 19).

The Lamfalussy framework has resulted in streamlined decision-making, promoted a wide ranging dialogue with industry and consumer groups and has disseminated its work and proposals to many stakeholders. However, it has been criticised as being too slow and lacking the institutional capacity to respond effectively to a cross-border financial crisis within the European Union.

As a result, renewed interest has arisen regarding whether further institutional consolidation should be taken at the EU level and in particular whether the Level 3 three committees should be given some type of legal competence to exercise supervisory powers over financial firms and markets in the European Union. This is reflected in the joint guidance issued by CEBS and the European System of Central Bank's Banking Supervisory Committee (BSC) in 2006 that extends the guidance role of the Level 3 Committees from 'going-concern' activities to crisis management cooperation. CEBS and the BSC have created a Joint Task Force on Crisis Management in order to enhance cooperative arrangements in a banking or financial crisis. The Task Force has issued guidance for supervisors to follow in the event of a systemic financial crisis with cross-border effect. (IIMG, 2007, p.19).

There is no meaningful distinction between the necessary supervisory arrangements for crisis prevention and crisis management given the crucial role of supervisors, acting in concert through colleges, to detect and forestall crises, along with their duties to coordinate crisis management operations with central banks and finance ministries. Indeed, if any institutional reforms can be made involving enhanced supervisory cooperation, it should be based on the weak link identified by the IMF in its 2007 *Article IV Surveillance Report* that advocated improving coordination between EU supervisors and central banks with respect to the oversight of the cross-border operations of financial groups in EU states (IMF, 2007, p.27; see also IMF 2006, para.12).

At the present stage of EU financial development, EU regulatory institutions should promote a twofold financial policy that links the institutional design and scope of EU financial regulation to the degree of integration in EU financial markets. This means that broad principles devised at the EU level should be implemented by national authorities, which would result in more precise regulatory rules that might differ between member state jurisdictions but essentially achieve common objectives intended by EU high level principles and standards. Any institutional consolidation at the EU level that goes beyond the Lamfalussy framework and seeks to achieve more harmonised EU regulatory rules across EU states should strike the right institutional balance between EU institutions and member state authorities and the achieve the precision of regulatory standards and rules needed to achieve financial policy and regulatory objectives, while respecting to an appropriate extent diversity of financial market practices and institutions across EU member states. Further, the institutional structure should contain an adequate level of flexibility to evolve and to adjust regulatory standards in response to innovation and changing practices and structures of financial markets.

The rapidly changing nature of financial markets means that regulators and supervisors must be able to act quickly to address unforeseen risks and threats to financial stability, while communicating their actions clearly to all stakeholders<sup>36</sup>.

## 6.22 The EU and Basel 2

The EU Financial Services Action Plan (FSAP) seeks to address prudential supervision by incorporating latest regulatory practices of international standard setting bodies (e.g., Basel Committee and IOSCO) that are implemented through EU directives and regulations (UK Treasury *et al*, 2003). For instance, the Capital Requirements Directive seeks to implement the standards and rules of Basel 2 into EU member state regulatory regimes and to provide an effective framework for unwinding insolvent institutions.

The Capital Requirements Directive (CRD) for credit institutions and investment firms incorporates the rules and standards on capital measurements and risk-based supervision contained in the Basel 2 into the European Union<sup>37</sup>. In January 2007, member states began transposing, and credit institutions and investment firms began applying, the CRD.

During 2007, financial institutions and firms could choose between the current "Basel 1" approach and the simple or medium sophistication approaches of the new framework. Beginning in January 2008, all EU financial firms must begin applying Basel 2, which includes adoption of the sophisticated approaches for the calculation of regulatory capital and the estimation of operational risk. The major weaknesses in the CRD stems from the flawed regulatory model of Basel 2 – a model that attempts to approximate a bank's regulatory capital to its economic capital without directly focusing on the externality of systemic risk – and hence fails to protect society from the social cost of bank risk-taking and banking behaviour.

To apply Basel 2 to the cross-border operations of banks, the Committee adopted certain principles of home-host country control to facilitate the approval of Basel 2 credit risk methodologies on a cross-border basis. Although these principles are generally vague regarding the specific allocation between home and host country authorities for approving and validating a bank's risk methodologies internationally, the principles urge home and host authorities to cooperate and to facilitate the approval and validation of a group-wide internal model. In the CRD, EU policymakers have decided to specify the exact scope of the home country supervisor's authority to include only the approval of the home bank's validation of its internal credit risk models used throughout the EU/EEA. In other areas not expressly provided in the home supervisor's authority, such as operational risk, home and host authorities would have to come to agreement regarding the approval of the bank's validation of its internal models.

To address the implementation challenges of the CRD, the Commission has decided to set up a specific working group – the CRD Transposition Group (CRDTG). The objective of the group is to facilitate correct and coherent transposition of the CRD in Members States legislation and regulatory rules. In particular, the CRDTG will provide all interested parties with interpretations on the CRD and to make them available on the websites of the Commission and of CEBS.

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<sup>36</sup> Developing a flexible institutional balance to take account of changes in the European economies and social structures has been accepted as a legal principle of European Union jurisprudence. See ECJ cases *Meroni* and *Chernobyl*.

<sup>37</sup> Technically the CRD recasts two existing Directives (2000/12/EC and 1993/6/EEC) and comprises two new directives – 2006/48/EC and 2006/49/EC. The European Parliament approved the CRD in a plenary vote on 28 September 2005.

An important function of the CRD working group is to identify possible differences in national transposition and whether these differences can lead to competitive distortions and other problems in the internal market and to develop proposals to deal with those problems.

A major issue to be assessed in the light of this Report is whether the limited changes introduced by the Capital Requirements Directive and the Capital Adequacy Directive that implement Basel 2 suffice to address the growing risks posed by integrated financial markets (as evidenced by recent events) *and* consolidated and centralised banking groups operating in multiple markets.

### **6.3 Enhancing financial crisis management**

On 5 May 2006, ECOFIN endorsed a report issued by the EU Financial Services Committee (the “Francq Report”) that called on EU regulators to set new targets for increased convergence in regulatory and supervisory practices and to adopt mediation procedures to resolve disputes between EU regulators. The goal is to make cross-border regulation more consistent.

The report’s recommendations are addressed to CEBS, CESR and CEIOPS and seek to enhance the operations of the Lamfalussy supervisory arrangements and to promote convergence and strengthen cooperation in regulatory practices across the EU.

Specifically, the securities regulators in CESR were asked to build and test a mediation mechanism by the end of 2006. The other Lamfalussy committees for banking and insurance adopted their own cross-border mediation mechanisms in 2007 that are specially designed to take account of prudential concerns in both the banking and insurance sectors respectively (CEBS, 2007).

ECOFIN used the Report to encourage national regulators to cooperate, delegate tasks, share information, and streamline reporting requirements. This reflects growing pressure for supervisory convergence as international mergers and growing cross-border trade in financial services require most financial services groups to report to multiple regulators. The development of a single set of pan-European rules under the FSAP has not been enough, as the financial services industry has complained that they are hampered by conflicting interpretations of rules and overlapping regulatory mechanisms. The Report has reinforced the institutional consolidation of the three Lamfalussy committees in devising regulatory rules to implement high level principles and obligations contained in EU legislation.

The Finance Ministers endorsement of the Report is evidence of the political will of member states to address the growing problem of how to coordinate cross-border supervision in EU financial markets. The Report’s proposal to establish a non-binding mechanism to help solve ‘day-to-day supervisory disputes’ demonstrates the inadequacy of the present framework of EU member state supervision. Under the proposal, member state supervisors would control the process. But financial services groups have expressed the concern that dealing with multiple regulators leads to duplicative procedures and sometimes contradictory supervisory guidance. Such disputes arise when regulators interpret EU directives differently, or follow supervisory lines or guidance that are perceived as too strict or as too lenient by peer regulators. Partly because of these disputes and a lack of trust between regulators, regulators have not wholly adhered to EU laws that allow supervision of a company subsidiary in one member state to be delegated to the home member state of the subsidiary’s parent company.

Other concerns arise regarding the implementation of complex directives such as the CRD and MIFID due to the potential for lost efficiency gains in applying the principles because of too many divergent interpretations and supervisory practices.

This raises the question of whether there should be some delegation of supervisory authority to an EU body or EU inter-regulatory council to make interpretations and resolve disputes.

The Finance Minister statement shows that there is a political agreement and recognition of the need to bring about substantial institutional change in how regulators in Europe interact, but the exact contours of any institutional framework have not been defined.

### **6.31 The role of the ECB in crisis management**

The European System of Central Banks (ESCB) and the European Central Bank (ECB) were established by the Maastricht Treaty of 1993<sup>(38)</sup>. In addition to the ECB having authority to regulate the euro and to conduct monetary policy for countries within the eurozone, it also has the authority to regulate the institutional and operational aspects of payments systems throughout the ESCB/EU<sup>(39)</sup>. Article 105 (2) of the Treaty and Article 3 of the Statute provide: “The basic tasks to be carried out through the ESCB shall be . . . to promote the smooth operation of payment systems”. Further, Article 22 of the Statute provides: “The ECB and national central banks may provide facilities, and the ECB may make regulations, to ensure the efficient and sound clearing and payment systems within the Community and with other countries”. The ECB’s capacity to issue regulations in the area of payment systems has also raised the issue of the prudential role of the ECB *vis-à-vis* the national central banks.

Moreover, it should be recalled that the ECB presides over the Eurosystem, which is composed of the ECB and the fifteen EU member states that have adopted the euro, and has responsibility over certain regulatory issues regarding payments systems and clearing and settlement within the ESCB, which covers all twenty seven EU member states. The ESCB regulatory framework has been accompanied by a number of legal acts and regulatory standards that address institutional and operational issues for the conduct of monetary policy within the Eurosystem and the regulation of payments systems throughout the European Union<sup>(40)</sup>. The creation of the ESCB/ECB framework and the adoption of the euro have created a new monetary and financial law for Europe<sup>(41)</sup>. This legal and regulatory framework is dynamic and has developed to take account of the changing structure of EU banking and financial markets.

The ESCB regulatory framework has emerged as an important arena for the regulation of systemic risk in both the Eurosystem and across the EU. It consists of a number of legal acts, regulations, non-binding guidance, and opinions that provide the governance framework for monetary policy and payments systems regulation<sup>(42)</sup>. The ECB is required to implement the regulatory tasks of the ESCB in a decentralised manner by having “recourse to the national central banks to carry out operations which form part of the tasks of the ESCB”<sup>(43)</sup>.

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<sup>38</sup> The European System of Central Banks includes all twenty seven member states of the European Union.

<sup>39</sup> Art 105 (2) of the Treaty establishing the European Community and Article 3.1 of the Statute of the European System of Central Banks (“ESCB”) and the European Central Bank (“ECB”) recognising oversight as a *basic* task of the Eurosystem.

<sup>40</sup> The legal basis for the ESCB regulatory framework is found in Part III and Title VII respectively of the Treaty establishing the European Community and the Protocol on the Statute of the European System of Central Banks and the European Central Bank (The Treaty and the ESCB Statute).

<sup>41</sup> The ECB has primary responsibility for overseeing cross-border payment systems in euros and between euros and other currencies, as well as cross-border payment systems throughout the EU.

<sup>42</sup> Within the ESCB regulatory framework, the ECB’s primary tasks are to conduct monetary policy (Art 105 (2), TEU), oversee foreign exchange operations, manage the official reserves of the member states, and promote the smooth operation of the payments systems. The ECB’s field of competence also covers the minimum reserves for banks, the collection of statistical data, and the adjudication and imposition of sanctions. Art 19, ESCB Statute, and Regulation (EC) no. 2818/98 (ECB/98/15).

<sup>43</sup> Art 12 1(3), ESCB Statute.

The decentralised approach to executing and implementing ESCB regulatory objectives suggests that many ESCB regulatory tasks are carried out by member-state central banks and national banking regulators under the laws of their national jurisdictions. This means that member-state laws will govern the contractual, regulatory, and other legal issues that arise regarding the national central banks relationships with market participants and the infrastructure of clearing and settlement and payments systems.

Regarding prudential supervision, Article 105 (5) of the Treaty states that “the ESCB shall contribute to the smooth conduct of policies pursued by the competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system”<sup>(44)</sup>. Article 25.1 of the ESCB Statute authorises the ECB to “offer advice to and be consulted by the Council, the Commission and the competent authorities of the Member States on [all relevant legislation]”. The ECB’s advisory role in supervising credit institutions, however, can only be extended into a more direct prudential function if it satisfies the requirements of Article 105 (6) of the Treaty that state, in relevant part, “the Council may, acting unanimously on a proposal from the Commission and after consulting the ECB and after receiving the assent of the European Parliament, confer upon the ECB specific tasks concerning the policies relating to the prudential supervision of credit institutions”. It would require strong political support – which has not existed - within the Commission and the Parliament to vest the ECB with prudential supervisory powers.

Although at present the ECB exercises no direct prudential supervisory authority over financial institutions, its broad mandate to promote the smooth functioning of the payments systems throughout the EU may imply that it has the power to issue regulations or opinions in interpreting the treaty or ESCB statute that would allow it to set standards to be implemented by member state regulators in some areas of prudential supervision. This interpretation reflects the general view that the ESCB framework is not static, but dynamic, and has the capacity to evolve and to expand its powers, if necessary, in order to meet the regulatory challenges of complex financial markets and the cross-border threat of systemic risk.

Another example of ECB oversight and management of the ESCB involves its provision of settlement systems in EU state economies, and the oversight of clearing systems and other money transfer systems operated by commercial banks and large market participants, such as securities custodians. The Governing Council of the ECB can issue common oversight policies that may have implications for the conduct of monetary policy, systemic stability, the promotion of harmonised regulatory structures across the EU, and the regulation of cross-border payments within the EU and between the EU and non-EU countries. These common oversight policies are administered on a decentralised basis in which the national central banks provide the necessary facilities and oversight of payment and clearing and settlement systems within their national jurisdictions.

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<sup>44</sup> Art 3 ESCB Statute (stating the same language as the Treaty’s 105 (5)).

Similarly, in the area of settlement systems, the ECB and member state central banks are authorised to accept payments and financial collateral in the form of electronically recorded interests in dematerialised securities from certain institutions that include large money centre banks, public entities, central securities depositories, and regulated custodians of financial assets<sup>(45)</sup>. In addition, the ECB has an important power – that it has not yet exercised – that allows it to adopt regulations to ensure the efficiency and soundness of EU clearing and settlement systems within and among EU member states and also between the EU and non-EU countries<sup>(46)</sup>.

### **6.32 The ECB/ESCB and accountability**

The Maastricht Treaty and ESCB Statute contain provisions providing for the independence and accountability of the ECB and ESCB system. Although the ECB has high degree of autonomy in deciding what instruments to use in achieving its inflation objective and has treaty authority to oversee foreign exchange operations, manage the official reserves of the member states, and promote the smooth operation of the payments systems<sup>(47)</sup>, it is accountable for the exercise of its powers to EU finance ministers and the European Parliament. For instance, the ECB must issue reports on a regular basis to the European Parliament that provide financial information and statistics regarding the operations of the ESCB system (Alexander *et al.*, 2006). Moreover, the ECB president is required to appear before Parliament to report regularly on monetary policy and on regulatory and technical matters under ECB oversight. For example, on 11 September 2007, ECB President Jean Claude Trichet gave oral evidence before the Parliament's Economic and Monetary Affairs Committee and discussed ECB monetary policy and the impact of the US sub-prime crisis on European financial markets. Responding to an MEP's query regarding the ECB's role in the recent financial crisis and whether the ESCB statute should be amended to allow more accountability of the ECB to other EU institutions, he defended the ECB's independence and was critical of any efforts to reduce ECB independence because it would have negative an impact on interest rates, economic growth and financial stability<sup>(48)</sup>.

In addition, the ECB's acts and policies in managing the ESCB are subject to judicial review by the Court of First Instance and the European Court of Justice, while the delegated acts of national central banks and regulators in exercising authority related to the operation of the ESCB are subject to review by national courts.

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<sup>45</sup> Art 17, ESCB Statute.

<sup>46</sup> Art 22, ESCB Statute. See Council of Ministers statement on 'Clearing and Settlement' 13571/07 (Presse 217) (9 Oct 2007) p. 19 (ECOFIN).

<sup>47</sup> Art 108 TEU. See also Article 14.2 of the ESCB/ECB Statute for the ESCB's independence of oversight of the payment and clearing and settlement system and other related functions.

<sup>48</sup>See 'ECB President Trichet tells MEPs transparency and cooperation key' (12<sup>th</sup> Sept. 2007), *European Parliament News*. Trichet also addressed the role of rating agencies in which he stated that it might be possible to have voluntary benchmarking of good practice to improve their operations. In addressing the comments of some MEPs that the ECB should be more involved in the supervision of EU financial markets, he stated that '[i]n the EU banking system supervision is decentralised, and that '[w]hat we need is more team cooperation among national central banks'. *ibid.*

Another form of accountability involves obliges member state central banks (except the Bank of England) to be subject to enforcement actions by the ECB if they fail to comply with the requirements of the ECB/ESCB regulatory framework.<sup>49</sup> Based on the above provisions of the ESCB/ECB Statute and Maastricht Treaty, there is a delicate balance presently between the independent functions of the ECB and ESCB system to achieve its treaty and legislative objectives, and the accountability it has to EU institutions – including Parliament and Council – for the overall exercise of its independent functions. Its specific operations and relative success in dealing with the liquidity crisis that afflicted European financial markets in 2007 will be discussed below.

### **6.33 EU crisis management and the lender of last resort**

Generally, EU central banks outside the eurozone can act as lenders of last resort to banks operating within their territorial jurisdiction. They can also provide funds to the operations of a bank in another EU state if the bank is incorporated or based in their jurisdiction. The exercise of the lender of last resort function in the ESCB is therefore decentralised and controlled by national member states (<sup>50</sup>). A banking crisis may require a national central bank to intervene to provide emergency liquidity. The costs of a bank bailout are usually large but uncertain and may involve levying taxes to finance a bailout(<sup>51</sup>). This is why national authorities – either national central banks, finance ministers and/or regulators - must be involved. In a cross-border crisis involving banks and financial firms with operations in several EU states and even outside the EU, the problems can become even more pronounced.

Nevertheless, the relevant provisions of the EC Treaty and ESCB statute governing emergency liquidity apply to the lender of last resort actions of both EU and eurozone member state central banks. Many commentators agree that the provisions governing emergency liquidity lack clarity and have been subject to a variety of interpretations regarding the exact role of the ECB and national central banks (Goodhart, 2000; Kremers *et al.*, 2000; Padoa-Schioppa, 2004; Lastra, 2006). A growing view has emerged that EU and ESCB procedures and mechanisms for resolving a financial crisis should be publicised in advance and that they should be clear regarding which EU institutions and member state bodies should have responsibility for providing emergency liquidity.

Emergency liquidity would usually be provided in three types of crises. 1) payment system crisis, 2) general liquidity crisis, and 3) classic liquidity crisis.

A payment system crisis can occur when there is a breakdown in the payment system between central banks and the main money centre banks. As most payments are settled through the banking system, it is difficult to separate the supervision of the payment system (an ESCB responsibility) from the supervision of individual banks (a member state responsibility).

Therefore, uncertainty can arise regarding the ECB's competence, acting through the ESCB, to regulate and supervise the payment system of EU member states which would involve oversight of the conduct of payments between banks and the prudential supervision of individual banking institutions which remains an EU member state function.

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<sup>49</sup> Art 3 ESCB/ECB Statute.

<sup>50</sup> The Treaty of Maastricht and the ESCB Statute empower the European Central Bank to act as a lender of last resort by engaging in open market operations and regulating the eurozone payment system.

<sup>51</sup> By the end of December 2007, tax-payer backed loans to support Northern Rock had reached approximately £27bn

A general liquidity crisis can arise from a collapse of the financial markets in the form of a stock market collapse or a loss of confidence by banks and investors in each other. The central bank can inject liquidity to the market through open market operations, which involves the central bank entering repurchase agreements for the debt securities of major financial institutions in order to increase the supply of money into the banking system. This can in theory lead to a reduction of interest rates on the loans made by banks to each other in the short-term loan market. In the recent financial crisis, the ECB used open market operations to enter repurchase agreements with major eurozone banks in order to make more liquidity available to the financial system.

The classic response to a market liquidity crisis involves an individual financial institution providing sound collateral to the central bank in return for an emergency loan at a penal interest rate. The central bank's objective is not to cure a problem originating in the broader financial markets (eg., the payment system), but rather to address the short-term financial difficulties of an individual bank whose illiquidity could potentially spread to other banks and to the broader market. In the EU, national central banks and supervisory authorities and finance ministries are responsible for deciding whether to provide emergency lending based on good collateral (<sup>52</sup>).

In the general liquidity and classic liquidity examples above, two views have emerged regarding whether national central banks should act as agents of the ESCB system by undertaking emergency lender of last resort operations (according to Arts 14 (3) and 12 (1) of the ESCB Statute) in which case they would need to have prior authorisation of the ECB before making emergency loans (<sup>53</sup>), or whether they should simply act as autonomous national agencies (<sup>54</sup>). The ambiguity of the Treaty and the ESCB statute in addressing this issue appears to reflect a political compromise or political inability to resolve this issue in a more precise way.

The ambiguous division of authority between the member state central banks and the ECB has created significant uncertainty regarding the ECB's role in a liquidity crisis. This has undermined procedural transparency in the ESCB lender of last resort function which could exacerbate the impact of a financial crisis. However, a former ECB official, Tommaso Padoa-Schioppa, dismissed these concerns, arguing that the criticisms reflected an outdated notion of the lender of last resort, a too restrictive notion of how the LOLR should operate, and underestimates of the Eurosystem's ability to act pragmatically in a crisis (Padoa-Schioppa, 2004).

Padoa-Schioppa's views appears to have been vindicated in the recent crisis in light of the ECB's successful management of market operations to inject liquidity into the eurozone banking system during the liquidity crunch.

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<sup>52</sup> The definition of what types of collateral to take is not harmonised at the EU level, nor is it defined in the ESCB statute.

<sup>53</sup> Based on article 18's provisions regarding discount and credit operations. Article 18(1) provides that the ECB and NCBs may 'conduct credit operations with credit institutions and other market participants with lending based on adequate collateral.'

<sup>54</sup> See art. 14 (4) ESCB Statute.



### 6.34 Recent developments

The Eurosystem's apparent success in 2007 in performing its liquidity function does not negate the need to have contingency planning in place to help forestall or mitigate the impact of a future crisis. Some progress has been made in recent years in addressing the need for improved coordination between central banks and banking supervisors within member states and across the EU during a crisis. In 2003, the Banking Supervision Committee of the ESCB and CEBS jointly developed recommendations to assist EU banking supervisors and central banks in preparing for and responding to a financial crisis. This led to the adoption later in 2003 of a Memorandum of Understanding on cooperation in crisis situations<sup>(55)</sup>. In May 2005, a second MOU was adopted containing the same principles of cooperation and coordination during a financial crisis, but the scope of the MOU was expanded to include in the deliberations surrounding a financial crisis not only the bank supervisors and central banks, but also EU finance ministers as well.

The MOUs were tested in several so-called 'war games' in which the need for more refined principles for cooperation and exchanges of information were identified in cases involving cross-border and systemic problems.

On 9 October 2007, the Council of Ministers approved enhanced arrangements for managing a cross-border financial crisis that has systemic implications within the EU by authorising the Economic and Financial Committee to prepare an extended Memorandum of Understanding that will build on the 2005 MOU. The new MOU will establish common principles, and a common analytical framework for assessing the systemic implications of a potential crisis and will ensure that all supervisory authorities are using common terminologies in examining the cross-border implications of a systemic crisis. The MOU will also set out "practical guidelines for crisis management" that provide a common understanding of the steps and procedures that need to be taken in a cross-border crisis<sup>(56)</sup>. The common principles recognise that the objective of crisis management is to protect the stability of the financial system in the EU as a whole while reducing the social costs of harmful financial activity. Although private sector solutions will be given primacy in resolving a crisis, the principles emphasise that managers should be held accountable and that shareholders should not be bailed out, and that public money should not be used unless there is a serious disturbance to the economy and the overall social benefits of the bailout exceed the public costs of recapitalising a failed institution<sup>(57)</sup>. Supervisory arrangements for crisis prevention must be consistent with supervisory arrangements for crisis management and resolution.

In addition, it should not be forgotten that *ex ante* regulatory and supervisory practices are needed to forestall a financial crisis. To this end, EU banking supervisors and central banks have agreed to enhance their cross-border information sharing and coordination arrangements by drawing on the principles in the MOUs and enhancing their application in Articles 129 to 132 of the Capital Requirements Directive (CRD) by adopting into law the requirement for increased coordination and cooperation between home and host supervisors for the monitoring and supervision of cross-border banking groups "in normal times and emergency situations" (CEBS 2006). In 2006, the three sister Lamfalussy Committees (banking, securities, and insurance) recognised the need for increased supervisory convergence across the financial sectors to promote improved convergence in supervisory practices.

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<sup>55</sup> The Banking Supervisory Committee of the ESCB prepared the MOU. See discussion in CEBS Annual Report 2004 p. 24.

<sup>56</sup> See Council of Ministers (ECOFIN) statement on 'Clearing and Settlement' 13571/07 (Presse 217) (9 Oct 2007) p. 23.

<sup>57</sup> Ibid at 26.

The three committees have a joint work programme in place since February 2006 and signed a protocol to exchange information and cooperate in various functions in 2005. Significantly, they have taken a keen interest in the supervision of financial conglomerates. CEIOPS and CEBS formed an Interim Working Committee on Financial Conglomerates (CESR has observer status) that became operational in 2006. The new committee focuses on the regulatory and supervisory challenges arising from the implementation of the Financial Conglomerates Directive. In 2007, the Committee published a report on the eligibility of capital instruments for regulatory requirements and identified some of the main differences and similarities in the characteristics of regulatory capital to be used in banking, securities, and the insurance sectors (<sup>58</sup>).

Of necessity, and pragmatically, an over-arching regulatory structure and risk-management system is emerging.

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<sup>58</sup> This has important implications for determining what should be adequate capital instruments under both the CRD and the Solvency II Directive regulating the solvency ratios of insurance companies operating in the EU.

## **7. SOME LESSONS**

At the time of writing the crisis of liquidity in world financial markets is still unfolding. Its full and final impact can only be a matter of speculation. It is therefore premature to draw any definitive lessons. However, a number of areas merit consideration if systemic risk in the EU is to be better regulated and crisis management more effective.

### **7.1 Lender of last resort and the supervision of systemic risks**

Since August 2007, the scale of the ECB's operation to inject liquidity into the financial system has been unprecedented in size and scope. It has also been remarkably smooth. The Bank's focus has been on preserving stability in the euro money markets and supporting the integrity of the EU financial markets. The smooth operation owes much to the competency of the ECB, but also to a more relaxed approach to acceptable collateral than the Bank of England or Federal Reserve. (This was more necessity than perceptiveness given the range of sovereign credits that belong to the Eurosystem.)

The separation of monetary policy from bank supervision in the Eurosystem does not appear to have hampered the ECB's operational ability. Arguably it has been helpful because the ECB was simply focused on meeting demand for euro liquidity and not trying at the same time to be a supervisor, discerning who should receive support under what terms and when. In this regard the institutional structure appears to have been resilient to an arduous test, more so than many could have expected.

The issue however, is that while the separation of powers did not hinder the ECB "bailing out" the system, it may have hindered the ECB from playing a role that may have avoided the need for the bail out in the first place. One of the overriding issues noted in this Report is that many of the factors that contributed to systemic failure, with implications for the integrity of markets, were at a more micro level considered to be efficient. For whatever reason, supervisory agencies across jurisdictions were preoccupied with the adherence to rules that appeared to make sense at the level of individual institutions, but made less sense in the face of a major shock both to individual institutions and to the financial system as a whole. They were unable to lift their heads up to the bigger picture. They have become quasi-legislative institutions rather than quasi-monetary institutions. This would seem to have been the case in the United Kingdom, where the FSA appears not to have been concerned with systemic risk, whilst the Bank of England, though acknowledging its responsibility for systemic regulation, had no supervisory contact with the banks.

Arguably the lender of last resort is in a better position and incentivised to consider these systemic issues. But systemic stability and micro risk management are integrated; indeed, in some cases they represent a trade-off. Shifting risk from banks to traders improves search liquidity, but at the expense of systemic liquidity. Consequently, some involvement by the lender of last resort in the supervision of systemically important institutions would have systemic benefits.

This leads to a related concern. The UK authorities would readily admit that the institutional structure in the UK was found to be insufficiently robust. However, the Eurosystem and the UK are not wholly dissimilar.

Under both systems, the central bank has responsibility for monetary policy and an overarching inflation target and banking supervision is carried out by independent agencies. There are, of course, formal and informal communication lines between the two. The more subtle problem, evident in the UK, was that this separation no longer breeds officials with the appreciation of systemic risks that naturally arises out of an experience that combines banking supervision with open-market and foreign exchange operations. Systemic risks are linked to liquidity risks. It will be argued below that credit rating agencies are not best placed to give liquidity guidance to investors as they are not market institutions. Institutions engaged in the market are best placed to understand liquidity issues. In a similar vein, it is not clear that an institution can be competently responsible for systemic risks if it is isolated from both supervision and open market operations.

A potential development on an EU scale would be for the Working Committee on Financial Conglomerates to take on a more defined and specific function by supporting member state supervisors in monitoring and coordinating supervisory activities over the twenty or so systemically relevant, largest banking and financial groups in Europe. The Financial Conglomerates Committee could take on a broader strategic view of the European market as a whole and examine the risks and related challenges posed by financial conglomerates to the European financial system.

The Working Committee should conduct research into systemic issues, working closely with the ECB in a mutually informative and supporting role. In supporting this function, it may be necessary for the EU governmental institutions to adopt primary or secondary legislation to give the Committee legal competence to perform oversight and surveillance of these cross-border financial groups<sup>(59)</sup>. In due course, the Committee could become a focus for the discussion of systemic issues that arise not only across EU borders, but also within member states, and throughout international financial markets.

### **7.11 A legal device to enable banks to be taken into public administration**

In the United States the Federal Deposit Insurance Corporation (FDIC) has the ability to take a bank into a form of federal administration if the bank violates minimum capital requirements or other prudential obligations, or is not able to meet its creditor claims (FDIC, 1998). The FDIC acquires a controlling interest and other shares in the company are typically frozen. A new management team is then charged with rescuing the bank and, if possible returning it to profitability. If this goal is achieved then the bank is returned to the private sector with any profits in the interim being shared between the FDIC and the shareholders.

This approach has two major advantages. It takes the company's shares off the market, so eliminating the nonsensical situation of the market effectively trading the government's guarantees. It also avoids the need for the public authorities to acquire all the existing shares at what can only be entirely artificial price, as is required with full nationalisation. The availability of a similar legal framework within the EU would add significantly to the protection of depositors, and provide a further means for dealing with systemic crises.

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<sup>59</sup> A financial group could qualify as a cross-border group if, for example, a certain percentage of their assets are booked in another EU state, and/or a certain value of their liabilities is booked in another state.

## 7.2 Credit rating agencies

Credit rating agencies were critical to the growth of securitisation, CDOs and SIVs. Banks would have found it hard to profitably sell-on individual loans of borrowers that generally were denied direct access to the capital markets. Packaging and structuring slices of the loans together into a CDO or SIV created a focus on credit risk and a diversification of credit risks that were attractive to a wider group of investors, but it also made the instruments more obtuse and so, for the market to work, investors required a credit rating.

Increasing attention has been placed on the inherent conflicts of interest in the relationship between banks, credit ratings and investors. The credit ratings were for the use of investors, but were paid for by the arrangers – the banks. The arrangers made more profit the more they could convince the rating agencies to give packages made up of risky instruments a higher credit rating. The rating agencies made more profit the more banks gave them packages to rate. The more discerning the rating agency over what it rated and the less generous its ratings, the less business the rating agencies would do. Were the rating agencies overly influenced by the banks who were paying them to give the packages a higher rating than they deserved, at the eventual cost of investors? An analogy is with the bank analysts during the dotcom bubble, who, it is alleged, were encouraged to give generous ratings to companies in order to help them win lucrative corporate finance mandates. The investment banks never admitted fault but they did pay a fine of \$1.4bn to settle the issue.

It is clear that investors have, yet again, paid a price. It is also clear that, ex post, the ratings appeared generous and, that these credit ratings have become so mistrusted that the assets did not have the liquidity expected of instruments with good ratings. Proving that credit rating agencies connived with banks to push up ratings is less clear.

It has been argued that one of the problems was that investors did not understand what the ratings meant. It is possible that they were confused between credit risk - the risk of default or some credit event - which is what the ratings were for, and liquidity risk - the risk that the assets could not be sold on to someone else. Some have suggested that the rating agencies should have provided a liquidity rating as well. We would caution against that. Liquidity and credit analysis are very different. A credit view can be taken by a smart analyst working at home with (largely) publicly available data on an entity's liabilities. Once established, it is a view that is likely to change only slowly, especially for the highest rated entities. Liquidity conditions can change rapidly and require an appreciation of market liquidity not easily gained outside the market places. Liquidity judgments are best left to market participants.

But the degree of confusion over what ratings mean is worrying. It is not clear that this confusion was deliberate but there were commercial forces that made it likely to happen. Rating agencies were trying to extend their "brand" from corporate bond ratings, where they have an established presence, to structured credit. To support the brand they wanted to use rating labels that had a resonance with their existing ratings.

At first sight it would appear that the principal solution to the current debilitating concern over the veracity of ratings is to ban arrangers and issuers from paying for ratings as a result of the conflict of interest and lack of independence.

The problem is that this neglects the fact that ratings are a “public good” in that they only have value to issuer, investor and market if all investors are aware of them, and if all investors are aware of them, it is hard to get any individual investor to pay for them. Rating agencies have tried. If investors will not pay, the only alternative is issuers or government. But the public sector should steer clear from impinging on how ratings are derived. At best this would lead to a perception that the government was morally obliged to protect investors from losses that were the result of following government funded or approved ratings. At worse, there could be a loss of confidence in ratings if what little the scope for innovation and competition there was left in the industry’s oligopoly structure was eroded by prescriptive and burdensome regulation.

### **7.21 Standardised nomenclature for credit ratings**

One of the most effective forms of social intervention across human activity is the establishment of convention: longitude, Morse code, common rail gauges etc. In contrast there are three main credit rating agencies each with their own similar, but different rating nomenclature, which they augmented in similar but different ways to extend ratings to credit derivatives and structured finance instruments. In quiet times these differences appear insignificant and are easily ignored by investors. In stressful times these differences and confusion around them become important. It is interesting to note that the CRD tries to standardize the meanings of ratings with regards to estimating the probability of default (PDs) of rated instruments on bank balance sheets.

Commercial pressures and fear of anti-trust action has so far impeded standardization in the nomenclature of ratings and it may require the public sector to play a coordinating role, in the same way that standardization of railroad tracks in the United States required Congress to intervene with the 1863 Pacific Railroad Act (4 feet 8 1/2 inches).

The rating agencies should be invited to consult with each other, with no fear of being accused of anti-competitive behaviour, to develop standard definitions and nomenclature. How rating judgments are arrived at and the basis for applying them to specific entities will remain the preserve of the individual rating agency. Public co-ordination around the definition of ratings should not lead to any implicit public approval or guarantee of ratings.

### **7.22 A new SRO to monitor the ratings industry**

We accept the view of the Committee on Economic and Monetary Affairs, articulated in its motion for a parliamentary resolution, which states the Committee “Decisively rejects any attempt at regulatory intervention into the substance of the opinions expressed by the agencies, by means of their ratings and other statements, regarding the creditworthiness of the debtors that they assess, or in the timing of publication of such ratings; stresses the need for total freedom of expression and for the agencies’ independence from political and business influence”. However, given the central role that ratings agencies play in the operation of modern financial markets, the incorporation of ratings into the financial strategies of many retail funds, such as pension funds, and the “public good” character of their outputs, it is important that the activities of the agencies are monitored by an effective body that fully understands the industry, in which the public can have confidence and which is independent.

This role could perhaps best be filled by a publicly chartered self-regulatory organisation, drawing its membership from the ratings industry, from major users of ratings information, and from “independents” with a close interest in financial markets. The structure of the SRO would therefore resemble that of the former UK financial sector SROs, such as the Securities and Futures Authority.

The tasks of the SRO would be to monitor all aspects of the industry (including the establishment of the new common nomenclature), to maintain a dialogue between the industry and all authorities responsible for the management of systemic risk, to promote innovation in risk modelling and policy and , to ensure that effective competition is maintained, to keep the public and the markets informed as to the activities of the industry, and to advise the public authorities. The SRO structure is designed to obtain the very best talent for the endeavour, to secure the commitment of the industry to public goals, and to help restore confidence in the veracity of ratings The SRO could be financed by a very small transaction charge in the same way that the US SEC's budget is met by a tiny charge on security transactions.

### **7.3 Banking regulation**

#### **7.31 Contra-cyclical capital charges**

It is sometimes forgotten that the reason bank regulators require banks to make capital charges is in order to reduce systemic risks. The key idea behind the capital adequacy requirement is that it should relate to the risks that banks take. A charge on risk should discourage them from taking risks that might impose costs on society as a whole. Regulatory capital is not a buffer. It cannot be used to cover losses, since maintenance of regulatory capital is a pre-requisite for a bank remaining in business. That is why banks try to maintain a buffer of economic capital above the regulatory requirements to maintain flexibility in their operation. So even when capital levels are above the minimum requirement, it does not mean that requirement is still having an effect on banking behaviour. The requirement is a minimum, not an average or optimum.

History tells us that the principal progenitor of systemic risks is the economic cycle. Credit crunches do not occur randomly; they follow credit booms. Financial institutions lend too much in the up cycle and are forced to dramatically pull back lending in the down cycle as their capital is depleted. The credit cycle augments the economic cycle. Given this background it makes sense for capital charges to be contra-cyclical: rising in the up cycle and falling back in the down cycle. Except in Spain where there is a history of contra-cyclical provisioning, regulators do not generally pursue contra-cyclical measures in the up-cycle. They do, however, often accept some forbearance during the down cycle<sup>60</sup>. This asymmetry - pro-cyclical in the up cycle and contra-cyclical in the down cycle militates against prudential behaviour.

There are two arguments against contra-cyclical measures. The first is that the authorities could not suppose to be any better at predicting the economic cycle than the markets. This is less viable argument than twenty years ago now that many countries have moved their central banks to an inflation target and the central banks have adopted economic models of the cycle to help inform their interest rate decisions.

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<sup>60</sup> Under pressure, regulators have adopted the pragmatic solution of “regulatory forbearance”. At the onset of the Latin American debt crisis in the early 1980s many major US banks were technically bankrupt, since Latin American assets held on their books had lost their entire market value. Nonetheless, US regulators allowed those worthless assets to be evaluated in the banks’ balance sheets at their value at maturity, hence boosting the banks’ notional capital and preventing a sudden collapse in lending and liquidity. Similarly, in the autumn of 1998, many assets held on the balance sheets of financial institutions in London and New York were, if marked to market, worth nothing. Again, the regulators did not insist on an immediate (potentially catastrophic) write down. This does not mean that regulatory standards were abandoned entirely: “... money centre banks whose loans to heavily indebted countries exceeded their capital in the early 1980s were allowed several years to adjust – but there was no doubt that they would have to adjust” (Turner, 2000).

Central banks are trying to predict the cycle every day. However, as many have argued predicting the cycle is not required if all that is desired is to lean against it (Borio and Lowe, 2002; Goodhart and Segoviano, 2004). The authorities may use a number of contemporaneous measures of the credit cycle such as trend growth in credit or bank lending to raise or lower capital adequacy requirements. These measures are unlikely to neutralize a boom, it may hinder the worse excesses, and perhaps even more importantly, it will mean that when the cycle turns down the banks have a stronger capital base to work from. Regulatory forbearance from a high base is better than forbearance from a disappearing base.

A second argument against contra-cyclical measures is that it opens the regulator up to political interference. There will be calls for regulators to reduce capital charges at the slightest whiff of economic slowdown. Regulation could become a political football. This was once said of monetary policy. Independence has worked relatively well in monetary policy, which is intrinsically more political than regulation. In addition to ensuring the political independence of regulators, another way to address the issue of politics is to make the contra-cyclical element as non-discretionary as possible.

Goodhart and Segoviano (2004) recommend that bank capital requirements should be related to the rate of change of asset prices in the relevant sectors. For example, the capital adequacy requirement on mortgage lending could be linked to the rise in housing prices, and lending to construction and property companies, to the rise in commercial property prices. Bank lending in other sectors where there are less reliable guides to asset prices could be linked to price changes in the relevant equity market sector. “The purpose of the exercise would be both to build up reserves and to restrain bank lending during asset price booms, so as to release them during asset price depressions” (Goodhart and Segoviano, 2004).

It is appropriate that as markets become ever larger, global and uncontrollable, that policy makers in general and bank regulators in particular, develop an “additional instrument” in the form of contra-cyclical capital charges. It is useful to note that this additional instrument could be introduced under the CRD through the supervisory discretion allowed for in pillar 2 of Basel 2. That said, it would be important that regulators do not pursue this with so much discretion that there would be arbitrage opportunities for bankers between the sensitivity of contra-cyclical measures in different jurisdictions. Perhaps a common framework for the imposition of this additional instrument could be developed and then approved by CEBS.

### **7.32 Common stress tests**

Regulators place much faith in stress tests. While there is little evidence that stress tests have reduced the incidence of stress, regulators encourage bankers to do more stress testing and bankers and investors try to reassure their clients by doing more stress tests. Millions of stress tests are carried out by bankers every year. One of the reasons why stress tests have not had the desired effect is that bankers and investors steer away from stress tests that question the business model and focus instead on avoiding the last crash or the one before it (Persaud, 2003). No doubt, Northern Rock could have withstood an exact repeat of the Asian financial crisis, but it could not withstand a freezing up of the money markets that the firm depended upon so much for its funding. In addition to the tests being “off-mark” the sheer multitude and subtle differences mean that stress tests are a process to carry out rather than something to analyse.

However, stress tests could be turned into important information instruments if regulators require all regulated institutions to carry out – in addition to any other stress tests they wish to do – two common stress tests, every six months. The first test would be devised by regulators.



Six months ago, regulators might have asked every regulated institution to report the impact on their liquidity and solvency of a 30% decline in all credit prices. The information the regulators would receive back from a single common stress test would be worth analyzing. When it comes to stress tests, less is more. It would tell regulators much about the location and concentration of risks. It would also tell them something about the sensitivity of the financial system to systemic risks that from an individual bank perspective, based on a dataset covering a period of tranquillity would otherwise appear to be a “once in a thousand year event”, not worth testing.

As a second test, regulators should also ask all regulated institutions to report the most likely stress test that leads to a point of illiquidity or insolvency for the institution. This exercise would be useful from an individual bank perspective, but regulators would also glean substantial information if there were concentration within the regulated sector as to the “once in a thousand year events” that would cause problems. Through these few common stress tests, the process of stress testing could become an important additional information instrument for regulators and not just another compliance box for bankers to tick.

#### **7.4 The future of CDOs**

The development of credit derivatives and the CDO market has had a significantly positive impact on risk bearing and risk management in financial markets. It has also produced a systemic crisis of massive proportions. The problem is clearly to develop a market structure that enjoys the benefits of credit risk transfer, and at the same time mitigates the downside risks. The baby should not be thrown out with the bathwater.

A major difficulty is the lack of comprehensive information on the transfer of risk. If the location of risk could be clearly mapped by the regulatory authorities, then measures could be taken, for example by means of capital charges, to disincentivise the accumulation of risk holdings that pose systemic risk.

##### **7.41 Retention of risk by the Arranger**

It has become evident in the current crisis that the inevitable lack of understanding of holders of CDO tranches has not been countered by effective risk management by the Arranger. The possibility of credit risk transfer has weakened the incentive of the originators to assess and monitor risk. One way to restore the incentive, at least in part, would be to require the Arranger to retain a proportion (say, 20%) of any CDO on its own balance sheet. This would not only encourage the Arranger to assess its own exposure carefully, it would also attract a capital charge.

##### **7.42 The role of SIVs**

The crisis of 2007 revealed some additional risks that will need to be addressed: the popular consensus as 2007 draws to a close is that SIVs in their current form cannot survive. In assessing the hidden additional risks in the SIV market, four topics should be explored:

*First*, are the banks adequately reporting the standby-credit facilities that are used to backstop such financing vehicles? *Second*, to what extent is there a moral duty for the issuer to step in and protect creditors where the vehicle is unable to draw on its standby facility? *Third*, is the capital (regulatory and economic) held against such facilities sufficient bearing in mind that any drawings are like to be made when liquidity is tight? *Fourth*, should the ratings methodology include some assessment of the liquidity of the vehicles long-dated assets – part of the current market problems are due to an inability by SIVs to quickly sell their assets?

One of the great unknowns of the recent crisis was the size of the backstop facilities granted by banks to facilitate the financing of SIVs. In order to secure a high rating for the commercial debt that is financing the bulk of a SIV's balance sheet, there is normally a bank back-stop in place to act as "lender of last resort". Should short-term financing ever be unavailable then the SIV may liquidate some of its assets (hence reducing its need for financing) or may call on its standby facility and fill any financing gap. Due to the complex nature of the backstop facility, one cannot say for sure that the SIV will always be able to call on it when financing is needed. Hence as the credit crises unfolded it became usual to talk about the legal or moral duty of banks to pay out on standby credit facilities. The latter would appear to apply to the situations where the standby cannot be called for mainly technical reasons and to the minority of cases where the SIV does not actually have a backstop in place at all.

Whatever the duty of a bank to provide a backstop credit facility to a SIV, the current crisis has revealed two factors that doubtless will question the allocation of capital against the facility. The first is that the numbers involved are huge even in the context of the world's largest banks; the second is that the SIVs needs for financing proved to be more highly correlated than bank models suggested, for reasons outlined in this Report. In assessing the level of capital held against a backstop facility there should be a realisation that the borrower is likely to be somewhat distressed at the time of drawing on the facility. For most corporate borrowers there are many sources of financing available, drawing on the stand-by is likely to be a last resort.

The second consideration, probably not applicable to standard corporate standbys but now shown to be highly applicable to the SIVs market, is the likelihood that the very economic conditions that bring about the drawing on one SIV back-stop facility are likely to trigger multiple drawings. In effect, if SIV exposure could be considered to be one "collective borrower" then additional capital may need to be set aside if total exposure exceeds some "large exposure" maximum.

If the capital requirement for a backstop is set to reflect the size of the liability during a rare crisis, then it is likely that banks will not be able to "afford" to offer backstops at all. Ideally, this should encourage those that do not require short-term liquidity to offer backstops. However, Solvency II will restrict the most capable candidates – insurance and pension funds – from offering this product.

### **7.5 Mitigating the negative impact of mark-to-market**

The spread of mark-to-market requirements (whether internally developed within firms or required by regulators) has been a major stimulus to the development of risk trading at the expense of risk absorption. This is another area in which there is a need to balance the positive benefits with negative systemic effects. Without the requirement of mark-to-market the serious deficits in many pension funds would not have been revealed, and the funding of pensions today would be far weaker and less secure. Perhaps there should be a better balance between providing more detailed information about liabilities and risks, but doing so less frequently.

An analysis of the structures currently being set up to invest in distressed structured credit assets gives some hint of what the market is trying to do to combat the joint perils of mark-to-market losses and forced sales. Private equity funds, by their (original) nature, do not respond to short-term market movements, and lock-up the funds committed to them for the duration of their investment cycle. In an area of financial service directly involved in trading, hedge funds are now typically launched with lock-ups. Where the investment universe includes illiquid securities lock-ups can be as long as 2-3 years.

But going beyond these market developments there is a need for regulators to assess the systemic impact of their mark-to-market requirements, and to manage them in such a way as to reduce the likelihood to disruptive forced sales. This will require regulators to take a wider view of macroeconomic conditions than they have previously done. But that is all to the good.

#### **7.6 A new approach to the content and structure of regulation, supervision and crisis management.**

A persistent theme of this Report is the intellectual failure of the philosophy of financial regulation that has dominated official thinking over the past two decades, and is embodied in Basel 2 and the CRD. The approach has concentrated to an excessive extent on microeconomic risk, it has used market based, risk sensitive techniques that, in the face of extreme events, can exacerbate systemic risks, and there has been a persistent failure to incorporate systemic risks into the design of regulatory institutions and of risk management.

The major lesson to be drawn from the current crisis is that a re-balancing is urgently needed. The rethink should include a greater differentiation between individual and systemic risks, recognition of the impact of the ups and downs of the economic cycle, the dangers of homogenous behaviour, and need for a balance between risk absorbers or risk traders.

## **Appendix 1: Types of CDOs and the parties operating within the CDO market**

CDOs are best categorised by considering the transaction type, the risk transfer mechanism and the existence, if any, of asset substitution mechanisms. These are discussed in the following sections.

### **Balance Sheet CDO**

The earlier CDOs fell into this category, so named because the driving force behind the transaction was the desire by the Arranger to manage its balance sheet. In a Balance Sheet CDO the assets that are sold into the SPV originate on the Arranger's balance sheet. The rationale for using a Balance Sheet CDO is complex because the benefits go beyond the deal itself. The Arranger is motivated to sell assets using a CDO by one or more of the following (i) to reduce the risk of these assets, (ii) to reduce the amount of assets on the balance sheet and/or (iii) to reduce the amount of capital tied up in these assets.

CDOs allow both the risk of debt instruments and the instruments themselves to be removed from a bank's balance sheet. This is achieved by either an actual sale of debt instruments to the CDO vehicle or by synthetic transfer of only the credit risk. In order to facilitate the sale of the CDO tranches, the original owner of the debt instruments may buy some or all of the first loss tranche.

### **Arbitrage CDO**

As investor interest in CDOs grew the supply of Balance Sheet CDOs was insufficient to meet demand and the rather rigid nature of Balance Sheet CDOs was not always what investors wanted. The assets in the Portfolio were limited to those that the bank wanted to sell; the maturities of these assets varied considerably resulting in uncertain maturity dates for investors and the rights of substitution were an obstacle for institutions (such as Insurance Companies) that need to get underwriting approval for each asset in the Portfolio. In addition, institutions other than those wishing to manage their balance sheet wanted to get in on the action. The resulting products were known as "Arbitrage CDOs".

The structures still use an SPV and still involve a Portfolio but the Arranger's motivations are very different. The deal only makes sense to the Arranger if the income from the assets in the Portfolio is greater than the cost of servicing the coupons on the tranches issued to finance the Portfolio. When this occurs, the Arranger has found the "arbitrage" i.e. the sum of the parts is cheaper than the whole.

The dynamics of the transactions are slightly different to those of a Balance Sheet CDO. The Portfolio has to be bought from the secondary market and this is unlikely to be done until the various tranche investors are close to agreeing on a transaction. Whereas in a Balance Sheet CDO the risk is all sourced from one bank, in an Arbitrage CDO the risk can come from many places. This means that the initial Portfolio can, up to a point, be selected by the investors, and any substitutions be they by the Arranger or by an asset manager (see **Managed Transactions** below), can often draw from a wider universe of assets.

For an Arbitrage CDO the economics are easier to assess as the transaction is “external” to the Arranger: the assets are sourced from third parties and do not result in any direct benefit to the Arranger’s balance sheet. Remuneration results from the difference between the income from the Portfolio and the cost of the tranche coupons. In addition, if there are substitution rights, the Arranger can see additional benefits from using these rights for its own economic advantage. Unlike the Balance Sheet CDO, there is no requirement of the Arranger to retain some of the equity tranche.

In the lead up to mid-2007 the majority of outstanding CDOs fell into this arbitrage category.

### **Synthetic CDO**

CDO investment vehicles hold large amounts of credit risk. The terms “cash” and “synthetic”, when applied to a CDO, refer to the methods of transferring this credit risk into the investment vehicle. Cash transfer means that debt instruments in the Portfolio are physically sold into the SPV that becomes the legal owner of those debt instruments. Synthetic risk transfer means that the credit risk of the Portfolio is transferred into the SPV using a credit derivative contract.

During 1997 credit derivative technology first started to be used by CDO arrangers to enable credit risk to be synthetically transferred into a CDO transaction. The new structures were known as “Synthetic CDOs” as opposed to “Cash CDO”.

The main difference is that the debt instruments are not sold into the vehicle. Therefore, although the SPV holds the economic risks and rewards of the Portfolio, it does not legally own them. Any credit derivative that transfers credit risk can be used to transfer the credit risk of the Portfolio in the SPV. The most common product used for this purpose is the CDS. This transfer is referred to as the “Portfolio Swap” and it is transacted with the “Portfolio Swap Counterparty” which is normally the Arranger (exceptions to this would be where the Arranger is the securities arm of a bank and the bank would be used for the swap).

Because the transfer of the risk is synthetic, it does not have to be done with an SPV; there is no reason why the Junior, Mezzanine and Senior tranches cannot be executed in swap form. In practice the preferred combination is to use a combination of bonds and swaps to reach as broad an investor base as possible in the most cost effective way. In a typical transaction the first 15% or so of risk is transferred to an SPV using a Portfolio Swap and notes are issued to investors as already described. The next 85% of risk is transferred to an investor known as the Super Senior Swap counterparty using a Portfolio Swap – no SPV or bonds are used for this transaction.

### **Managed Transactions**

Both Cash CDOs and Synthetic CDOs can be managed such that the assets in the Portfolio can be substituted with replacement assets. There are three different ways that this can be done: either the Arranger has substitution rights or a third party is appointed as portfolio manager or the investor has substitution rights - a so-called “Self Managed” deal.

### **Arranger Managed**

Arranger managed deals have dated back to the first Balance Sheet CDO transactions where the Arranger is tasked with both populating and substituting the Portfolio in accordance with portfolio guidelines.

These guidelines are normally rated by the Rating Agencies. The Arranger’s selection of assets will be limited by issuer, industry and rating but otherwise has discretion as to which and how the assets are substituted. This means that the investors are exposed to a Portfolio exhibiting certain characteristics but they are uncertain as to the exact make-up of the Portfolio.

Substitution rights in a Balance Sheet CDO present the Arranger with a conflict of interest since it is often hard to make substitutions that are good for both the Arranger and the investors. Sometimes the Arranger is in possession of inside information about a borrower and hence the investor normally wants to see controls in place to prevent substitutions being based on this information.

There are controls that are used try to ensure an element of consistency. For example, sometimes a replacement asset has to be an equivalent or better credit rating to the substituted asset and sometimes this test is based on the rating at the time that the substituted asset was first introduced to the portfolio. Rather than control the credit rating of a specific asset it may be preferable to control the weighted average rating for the whole portfolio. This gives the Arranger more flexibility and yet maintains the integrity of the Portfolio. Another control mechanism is the credit spread of the substituted asset. Sometimes the replacement asset has to have a spread equal to or better than the replacement spread times some factor.

Despite all of these controls there will always be an element of discretion on the part of the Arranger. To deal with any remaining nervousness of the part of the investors, as part of the marketing process there may be reference to the long term ambitions of the Arranger. Banks are in this business to do multiple deals; it therefore behoves them to minimise under-performance since one bad deal can severely tarnish future deals.

### **Third Party Managed**

The concept of third party managed CDOs is hardly new - fund managers have been managing debt funds for a long time. Most of this management has taken place in cash deals - the management of synthetic deals is relatively new reflecting the newness of credit derivatives.

Investing in cash assets and synthetic assets is not the same thing and the skill sets are not completely interchangeable. For this reason the number of debt asset managers who also understand credit derivatives is limited.

As with other structures and asset classes in a third party managed deal there will be a portfolio management agreement which details the roles and responsibilities of the portfolio manager and ensures that the necessary controls are in place to ensure independence. The third party assets manager will also be subject to Portfolio Guidelines as discussed in the previous section.

In an investor managed or “Self Managed” transaction there is normally only one tranche issued to one investor and that investor has limited ability to substitute assets. Requests for substitution are submitted to the Arranger who responds stating the economic implications of such a substitution. These normally take the form of a change in the return paid to the investor or a change in the subordination of the investor’s tranche. The investor can then decide whether to proceed with the substitution.

This section of the CDO market – the “Single Tranche” market – has grown to dominate the whole CDO market. Since there is only one investor, asset selection and replacements is easy to agree on. Hence the investor gets the best structuring flexibility.

### **Parties in a typical CDO structure**

#### **Arranger**

The main driver in any CDO is the Arranger. In a Balance Sheet CDO the Arranger provides the Portfolio. In an Arbitrage CDO, the Arranger sources the Portfolio. In a Synthetic CDO the Arranger is the Portfolio Swap counterparty. And in all structures, the Arranger sets up the SPV and distributes notes to investors.

The duties and responsibilities of the Arranger are therefore numerous and complex. Some are documented in the deal structure and some are imposed by market practice. Since the market's formation in 1994 but more importantly since the numerous disputed derivative transactions in 1997/98, Arrangers of all credit derivative transactions have become aware of the relatively delicate position that they occupy in the market. Arrangers are wary of their reputations and cognisant of the likely impact of a perception of inappropriate activity. Hence in both the more liquid "single name" credit derivatives market and the more complex CDO market, Arranger are partially controlled by market practice.

Arrangers of CDOs tend to be large and relatively sophisticated financial institutions – typically banks and securities firms who possess the necessary infrastructure and skill sets. Since large portfolios of assets are being sourced, moved, held or traded, these institutions will need to have the necessary skills to do this. Finding the assets requires skills in corporate finance and debt origination; holding assets requires balance sheet and infrastructure (systems etc.) as well as analytical risk assessment skills; moving assets requires financial engineering skills as well as balance sheet and infrastructure; trading assets requires infrastructure, capital, and risk trading skills.

In addition to these requirements, a CDO arranger needs very specialised credit structuring skills to put each transaction together. Selling the deals is also specialised and necessitates a dedicated marketing team. And risk managing each deal is highly complex calling on extensive quantitative resources that, for most institutions, are not readily available.

Given the normal size of a CDO transaction (in excess of US\$1 billion), a sizeable portfolio will need to be sourced in a short time period. For many institutions this may present a challenge – finding large pools of assets requires relationships, global reach, origination skills and infrastructure, and the uncertainties of this process present the Arrangers with certain risks. It may be that the assumed prices of the underlying assets are not available when the Portfolio is actually purchased. An Arbitrage CDO only works if the assets can be purchased at a cheaper all-in yield than the tranches are sold at. This is often referred to as "ramp-up risk" and is a risk that is normally absorbed by the Arranger. Part of the Arranger's fee is intended to compensate for ramp-up risk. This risk is not present in a Balance Sheet CDO as the assets are readily available.

### **Investor**

The investors' role in the CDO market has evolved from silent participant to market developer. The complex structures being used today have resulted from investor demands.

The breadth of investors is considerable, encompassing varying sized institutions drawn from a wide geography with broad levels of sophistication. At the larger end of the spectrum, government pension funds are participating in the higher quality tranches; in contrast, the medium risk tranches are increasingly being bought by the smallest investor – retail. Although these investors are mainly in North American and Europe, there is considerable appetite for CDOs in Asia with an increasing proportion of tranches being placed with yield hungry investors in that region.

In assessing the ability of investors to independently or otherwise judge the risks of CDOs there are three major considerations: Firstly, an assessment of investor sophistication with focus not only on the spectrum of investors (which continues to broaden) but also on the controls used by banks to ensure that the right product is sold to the right investor; Secondly, an assessment of models offered by vendors to such investors; Thirdly, the effectiveness of the data that feeds these models: this is harder due to the breadth of underlying debt instruments – the current crisis has highlighted the difficulty of valuing a pool of sub-prime mortgages.

It is likely that on average, investors are not that well informed as to what they are buying. Part of this can be blamed on the originator but part also on the apathetic investor. As of the end of 2007 it is the banks that are holding their hands up and declaring that at times they did a poor job explaining the risks of structured credit products. Investors are unlikely to reciprocate but there is already evidence that they are considering an increased investment in risk management and valuation platforms.

### **Portfolio Manager**

Portfolio Managers get paid for their services and normally accept that any pay should be performance linked. A typical structure therefore will provide a minimum fee level and an additional fee linked to maintaining losses at a minimum. Since the losses can theoretically all happen near to the maturity of the CDO, it is not unusual for any additional fees to be paid at maturity. The additional fees normally make up the bulk of the Asset Manager's compensation; here there is a strong incentive to do a good job throughout the life of the transaction.

Where the Arranger has rights of substitution or is the Portfolio Manager there are potential conflicts of interest that are normally limited or removed by controls in the deal structure. This does not mean that every transaction presents the Arranger with a conflict. Substitution rights that are used to improve a bank's return on regulatory and economic capital can be exercised for the benefit of all parties.

### **Rating Agencies**

The role of the Ratings Agencies is discussed in the main body of the Report.

### **Other Parties**

Other parties in a CDO include a Trustee – who acts for the benefit of the investors, ensuring rules are adhered to; the Administrator – who prepares quarterly reports etc., closely linked to the Trustee; the Custodian – who holds assets on behalf of the SPV; and the Paying Agent – who is responsible for paying coupons etc. on time;



## **Appendix 2: Glossary of terms.**

*Extracts from the CreditFlux glossary* <sup>(61)</sup>.

### **A**

#### **ABX**

A family of credit indices referencing asset-backed securities. The first index, ABX HE was launched in January 2006 and is based on tranches of 20 recently issued US sub-prime home equity securitisations. The second index, CMBX, was launched in March 2006 and references 25 commercial mortgage securitisations. Unlike other credit indices such as iTraxx and CDX, ABX consists of sub-indices for different rating bands such as triple A and triple B, reflecting the very different risk-return profiles of different parts of the capital structure of a securitisation. All the sub-indices are based on bonds from the same 20 securitisations. Another difference from corporate credit indices is that the composition of the index changes entirely every six months, since the index is designed to reflect the current crop of deals.

#### **Adjustable subordination**

A technique used in self-managed single-tranche CDOs. It allows trading gains and losses in the portfolio to be reflected in the tranche subordination. For example, if a credit that has widened is replaced, the tranche attachment and detachment points would decrease. In some transactions, gains and losses can also be added to or deducted from a trading account.

#### **Arbitrage CDO**

A CDO in which the arranger sets out to acquire exposures to take advantage of the difference between spreads on the underlying portfolio and spreads on the CDO liabilities. This is in contrast to a balance sheet CDO, in which an issuing bank sells exposures that are already on its balance sheet using a CDO. In practice, the distinction between arbitrage and balance sheet CDOs is a hazy one, reflecting the way the deal is marketed and perceived.

#### **Asset-backed credit default swap**

Also known as CDS of ABS, a credit default swap in which the reference obligation is an asset-backed security. These trades are documented using standards different from corporate (or financial) credit default swaps. In most cases they use pay-as-you-go settlement and include credit events such as principal writedown. Unlike most corporate credit default swaps, asset-backed credit default swaps reference a particular class of notes from a particular ABS issuer rather than a reference entity. Other differences are that the notional of asset-backed credit default swaps can be reduced during the life of the trade as the reference asset amortises, and the fact that payments are exchanged monthly rather than every quarter. To date, most asset-backed credit default swaps have been written on tranches of US sub-prime residential mortgage securitisations.

#### **Asset correlation**

The degree to which asset values move in tandem. Equity prices are widely taken as a proxy for asset correlation.

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**Assignment**

See novation.

**Attachment point**

The minimum level of losses in a portfolio to which a tranche is exposed. See also subordination.

**B****Balance sheet CDO**

Often referred to as a balance sheet CLO, a CDO in which an issuing bank sells exposures that are already on its balance sheet. This is in contrast to arbitrage CDOs, in which the arranger sets out to acquire exposures to take advantage of the difference between spreads on the underlying portfolio and spreads on the CDO liabilities. The first synthetic CDOs, issued in the late 1990s, were balance sheet transactions, designed to reduce banks' regulatory capital charge on loans on their books.

**Bankruptcy**

A credit event used in all corporate and financial credit default swaps. Under the credit derivative definitions, bankruptcy is defined quite widely to include the reference entity being dissolved, becoming insolvent, making an arrangement for the benefit of its creditors, being wound up, and having a judgement of insolvency made against it.

**Bankruptcy remote**

See special purpose vehicle.

**Basis point (bp)**

One hundredth of a percentage point. Credit default swaps are usually quoted in basis points, this being the annual premium the protection buyer pays to the protection seller, as a proportion of the notional size of the credit default swap. This means that a \$10 million credit default swap priced at 50bp pays a premium of \$50,000 a year.

**Basis to theoretical**

The difference between the spread of a credit index based on its traded price and the weighted average of the spreads of the individual credits included in the index. The greater liquidity of credit indices compared to single name credit default swaps means that index spreads tend to react more quickly to changes in market sentiment than single name spreads. This means that the basis often acts as a forward indicator of the direction of the market. When the market price of an index is higher than its theoretical value it is said to trade with a positive basis to theoretical. When the index price is lower than the average of the single names, the basis is said to be negative. A positive basis tends to be driven by market participants looking to buy protection, and therefore typically reflect a bearish view on credit spreads. A negative basis tends to be the result of more protection sellers than protection buyers, indicating a positive view on credit spreads.

**Basis trade**

See negative basis trade, positive basis trade.

**Basket**

See nth-to-default basket.

**Bespoke CDO or bespoke tranche**

A synthetic CDO in which the investor chooses the names in the reference portfolio, the attachment and detachment points, and other details. The term bespoke is sometimes used to contrast single tranche CDOs with full capital structure deals. More commonly, the term is used to distinguish synthetic CDO tranches from index tranches that use standard portfolios.

**Bid-offer spread**

The difference between the buying (bid) and selling (offer) price of any asset or exposure.

**Bids-wanted-in-competition (b-wic)**

A list of positions on which a counterparty seeks competitive bids in the hope of achieving the best possible price. Compare offers-wanted-in-competition (owic).

**Binary credit default swap**

A credit default swap using binary settlement.

**Binary settlement**

Also known as digital, a pay-out following a credit event that is a fixed amount rather than par less a recovery rate.

**Bond floor**

See constant proportion portfolio insurance.

**Borrowed money**

A term used in credit default swap documentation to refer to any credit arrangement in which the reference entity borrows money. This definition excludes forms of credit such as trade credit.

**Bwic**

See bids-wanted-in-competition.

**C****Calculation agent**

See cash settlement.

**Capital structure**

The mix of liabilities issued by a company. The capital structure of a corporate might range in descending order of seniority from secured loans, through unsecured bonds, through preferred shares to common equity. The capital structure of securitisation vehicles, including cash CDOs (see page ??), usually consists of debt with different ratings that are subordinated to each other through a cash waterfall.

**Capital structure arbitrage**

Any of a number of trading strategies designed to arbitrage the relationship between assets issued at different parts of a company's capital structure. Examples include convertible arbitrage (trading convertibles against equity options, for example), trading secured loans versus unsecured bonds of the same issuer and trading senior debt against subordinated debt of the same issuer.

## **Cash CDO**

See page 4.

## **Cashflow CDO**

The term cashflow CDO is often used interchangeably with cash CDO. It is also used to differentiate the majority of CDOs from market value CDOs. In a cashflow CDO, the overcollateralisation test is based on the par value of the collateral rather than its market value.

## **Cash settlement**

A payout following a credit event in which the protection seller pays the protection buyer an amount calculated as equivalent to the par value of a deliverable obligation less a recovery rate. This amount is determined by the calculation agent, usually by a dealer poll of the price of an obligation. The calculation agent is usually one of the two counterparties to the trade. Among the different types of credit derivative, cash settlement is most often found in the documentation for synthetic CDOs. However, counterparties to a physically settled credit derivative may agree to cash-settle, and this has been common for credit indices since 2005.

## **Cash waterfall**

Part of the terms of a CDO or securitisation that states how income from the portfolio will be allocated to different classes of liabilities.

## **Cheapest-to-deliver option**

The protection buyer's right to choose the deliverable obligation with the lowest value following a credit event. See restructuring.

## **CDO**

See collateralised debt obligation.

## **CDO squared**

A CDO in which the collateral portfolio or reference portfolio consists of other CDO tranches. See synthetic CDO squared.

## **CDS index protocol**

A document published by Isda which replaces physical settlement for credit indices with cash settlement using the price determined by a credit event fixing. Counterparties can override the physical settlement terms of their trades by signing a letter of adherence to the protocol.

## **CDX**

A family of mainly North American credit indices administered by Dow Jones.

## **Cliff risk**

The likelihood, in certain synthetic CDO structures, that the tranche notional will quickly be wiped out once losses in the portfolio reach the tranche's attachment point.

## **Collateral**

Assets used to secure a bond or loan, either through a legal mechanism such as a lien or through a structural mechanism such as a special purpose vehicle. In a cash CDO, the assets owned by the vehicle are known as the collateral portfolio or collateral pool.

### **Collateralised bond obligation (CBO)**

A CDO consisting of corporate bond exposures.

### **Collateralised debt obligation (CDO)**

An investment collateralised by, or referenced to, a diverse portfolio of debt exposures in which the investor is exposed to losses above and below certain thresholds. The purpose of a CDO is to transform credit risk into investments with a particular risk-return profile, such as low-risk, triple-A-rated senior tranches and highly leveraged equity or junior tranches. In this way, CDOs channel greater investment into credit than would be the case with direct investment in corporate and sovereign debt securities. The main types of CDOs are cash CDOs and synthetic CDOs. See also cashflow CDO and market value CDO.

### **Collateralised loan obligation (CLO)**

A CDO consisting of corporate loan exposures.

### **Confirmation (confirm)**

A document setting out the terms of a derivative such as a credit default swap. Confirms are usually supported by other documents, such as a master agreement between two counterparties, and sets of definitions.

### **Constant maturity credit default swap (CMCDS)**

A credit default swap in which protection payments float up and down in line with prevailing credit spreads rather than being fixed. See reference rate, participation rate. Constant maturity credit default swaps are based on the constant maturity swaps common in the interest rate derivatives market but have yet to gain anything like the same level of popularity.

### **Constant proportion portfolio insurance (CPPI)**

An investment in which the principal is notionally guaranteed by the use of a trading strategy in which allocations to a risky exposure and a low-risk (cash) position are adjusted periodically. This technique is often used to create principal-protected notes based on equity and hedge fund investments. Adjustments to the allocations are carried out based on the market value of the risky exposure and the cost of buying a zero-coupon risk-free bond that can be used to repay the principal of the security at maturity. The cost of the zero-coupon bond is referred to as the bond floor, and the size of the investment is not permitted to fall below this level. The reserve or cushion is the difference between the initial investment amount plus or minus any trading gains or losses. The size of the risky exposure is a multiple of the reserve. Related dynamic allocation techniques include dynamic proportion portfolio insurance (DPPI). See credit CPPI.

**Convergence trade**

A trade designed to benefit from the view that the price of two assets will converge. In the credit derivatives market, convergence trades are often put on because the trader believes that the spreads of two similar or related credits will converge.

**Convexity**

The tendency for gains or losses in an instrument to accelerate with changes in the underlying risk. An equity index tranche displays positive convexity compared to the credit index as a whole, because very high or very low index spreads will affect the value of the tranche much more than the index. High convexity is the same as high gamma.

**Copula**

a statistical tool describing how the distribution of single risks join together to form joint risk distribution. Copulas are used in the valuation of synthetic CDO tranches and other correlation-sensitive products.

**Corporate**

A non-financial borrower, that is, a company other than a bank or insurer. Corporates and financials make up two of the biggest categories of reference entities in the credit derivatives market.

**Correlation**

See implied correlation, default correlation.

**Correlation smile or skew**

A phenomenon whereby junior and senior tranches or a credit portfolio imply high correlation and mezzanine tranches imply low correlation. This is comparable to the skew seen in many option markets where different strikes imply different volatilities.

**Counterparty risk**

The risk that a counterparty to a derivative trade will be unable or unwilling to make payments due under the terms of the contract. In most credit derivatives, the main counterparty risk is the protection buyer's exposure to the protection seller. Credit default swaps are often collateralised using credit-linked notes or a credit support annex to address the risk that the protection seller will fail to make good the protection buyer in the event of a default by the reference entity.

**Credit CPPI**

A credit investment borrowing the constant proportion portfolio insurance technique (and its variants). A credit CPPI usually consists of a synthetic exposure to credit that, like in a synthetic CDO, is transferred to the investor through a credit default swap with a dealer. Credit CPPI trades can include a broader range of exposures than a synthetic CDO. They can be based on single name exposures, credit indices, index tranches, or some combination of these different instruments. Often the exposures are actively managed by an investment manager, although in other cases the basic composition of the portfolio is static. A key feature of credit CPPI transactions is that the size of the credit exposure can be adjusted over the time based on its market value. The initial investment is placed in a deposit, which is used to settle any credit events in the portfolio and to collateralise the credit default swaps.

The size of the synthetic credit exposure is determined as a multiple of the reserve, which is the size of the deposit less the amount it would take to buy a zero-coupon bond that can be used to repay the principal at maturity. Returns in credit CPPIs are usually back ended. However, more recently, the technique has been applied to transactions with coupons and even those with no protection of principal.

### **Credit curve**

The default probability of an entity over various time horizons. The cumulative default probability of any entity rises over time, therefore credit spreads are normally higher for longer maturities than shorter maturities. (However, for technical reasons, this is not always the case.) The greater the difference between long and short dated debt, the steeper the curve is said to be. The smaller the difference between long and short dated debt, the flatter the curve is said to be. (See curve steepener trade, curve flattener trade).

### **Credit default swap (CDS)**

An over-the-counter contract to transfer the credit risk of a reference entity, in which the protection buyer pays a premium and the protection seller makes a payment in the event of a default (credit event) by the reference entity. Most credit derivatives take the form of credit default swaps. See also single name credit default swap.

### **Credit derivative**

A contract designed to transfer the credit risk of an entity from one counterparty to another. The most common types of credit derivative are single name credit default swaps, credit indices, index tranches and synthetic CDOs.

### **Credit derivative dealer**

Also known as market maker, a bank or other firm that provides a service for other companies to buy and sell credit derivatives, making money from the difference between the buying (bid) and selling (offer) price. Although most dealers also trade credit derivatives for their own account, this proprietary trading or investment business is usually kept at arms' length from their market-making functions.

### **Credit derivative definitions**

A set of definitions of the terms used in a credit derivative confirmation. The wording of such definitions as restructuring, successor and guarantee can have a big impact on the outcome of a credit derivative trade. New definitions are drawn up periodically by Isda. The most recent, at the time of publication, are the 2003 credit derivative definitions.

### **Credit derivative product company (credit DPC or CDPC)**

A company that sells protection on credit derivatives based on a triple A credit rating, and whose triple A rating is based on models for capital allocation agreed with the rating agencies. Credit DPCs are similar in concept to monoline financial guarantee companies (see monoline insurers). However, unlike monolines, they are not regulated as insurers and take on risk in the form of derivative contracts rather than insurance policies.

### **Credit event**

An event that gives a protection buyer the right to settle a credit derivative. The three most commonly used credit events are failure to pay, bankruptcy and restructuring.

**Credit event auction**

An auction held to determine the final price at which credit derivatives on credit indices can be cash-settled for counterparties that choose to overwrite physical settlement using a CDS index protocol. See credit event fixing.

**Credit event fixing**

The process of determining the cash settlement price for a credit derivative using a credit event auction. At the time of publication, credit event fixings are used only for credit indices and are administered by Creditex and Markit Group.

**Credit event notice**

A notice by which the counterparty triggering the credit event (usually the protection buyer) informs the other counterparty that a credit event has taken place. The notice describes what exactly has occurred that the triggering party believes constitutes a credit event.

**Credit fixing**

See tradable credit fixing.

**Credit index**

See page 11.

**Credit index tranches**

See index tranches.

**Credit-linked note**

A funded credit default swap in which an investor sells protection by buying a bond issued by a dealer or special purpose vehicle. If there is a credit event, the principal (or part of the principal) of the note is reduced to the recovery rate.

**Credit opportunity fund**

A fund that invests in credit assets on a leveraged basis, usually through a total return swap with an investment bank. Credit opportunity funds resemble market value CDOs but gain leverage from a single bank rather than by issuing rated debt.

**Credit rating**

An opinion on the creditworthiness of a debt security or issuer issued by a credit rating agency such as Moody's, Standard & Poor's or Fitch Ratings.

**Credit risk**

The risk of financial loss as a result of the inability or unwillingness of an entity to make payments as they become due. Many types of relationship involve credit risk, such as those where a company owes money to its suppliers (trade debt) or where a counterparty is required to make payments under a derivative contract (counterparty credit risk). But perhaps the most common type of credit risk is where a company, person or government has borrowed money from a lender. This 'borrowed money' credit risk is the kind that is most commonly transferred using a credit derivative.



**Credit support annex (CSA)**

A collateral arrangement designed to reduce counterparty risk in a derivative contract. For example, a protection seller in a credit default swap would often be required to put up a proportion of the notional of the contract. If the market value of the trade moves against the protection seller, it would need to put up more collateral.

**Credit swaption**

An option on a credit default swap. See payer, receiver.

**Credit volatility**

See implied spread volatility.

**Crossover index**

Often written Xover, a credit index comprising a mixture of high-yield and higher yielding investment grade names. Crossover indices exist in North America (CDX NA XO) and Europe (iTraxx Crossover).

**Curve flattener trade**

A trade designed to express a view that a credit curve is likely to flatten in future. For example, a curve flattener on a single name may involve selling 10-year protection and buying five-year protection on that reference entity.

**Curve steepener trade**

A trade designed to express a view that a credit curve is likely to steepen in future. For example, a curve steepener on a single name may involve selling five year protection and buying 10-year protection on that reference entity.

**Cushion**

Or reserve, see constant proportion portfolio insurance.

**D****Dealer**

See credit derivative dealer.

**Dealer poll**

The process of finding a reference price for an asset by obtaining quotes from a number of dealers in that asset. In the credit derivatives market, credit default swaps are often cash-settled following a default by using a dealer poll to determine the value of a defaulted bond or loan.

**Default**

In the context of a credit default swap, default is synonymous with credit event. However, the term default has a number of alternative definitions that are narrower or wider than the term 'credit event'. For example, rating agencies define default narrowly – as a failure to make payments as they become due. In the loan market, the term is used to include a wider set of events that can require the borrower to repay the loan, such as breaches of covenants and changes of corporate control.

**Default correlation**

The degree to which the default probability of different credits moves in tandem.

**Default requirement**

The minimum size of a bond or loan default that can trigger a credit event in a credit derivative.

**Definitions**

See credit derivative definitions.

**Deliverable obligation**

An asset that is eligible to be delivered to the protection seller following a default or that can be used to provide the reference price for cash settlement. Any debt obligation that is pari passu or senior to the reference obligation counts as a deliverable obligation. (However, certain obligations, such as zero coupon bonds and those in minor currencies are usually excluded.) In this way, the reference obligation acts as a marker of the seniority of debt that is referenced in the credit default swap.

**Deliverable obligation category**

In credit default swap documentation, a description of the general type of obligations, such as bond, loan or borrowed money, that can be delivered following a credit event. The precise features of the deliverable obligations are defined in the deliverable obligation characteristics section. See also reference obligation category.

**Deliverable obligation characteristics**

In credit default swap documentation, a list of features that an obligation must include to be deliverable following a credit event. This is comparable to, and in many contracts identical to, the reference obligation characteristics (see page 42).

**Delta**

The sensitivity of a derivative to changes in the reference price. In synthetic CDO and index tranches, the sensitivity of the tranche to changes in the spread of the underlying names. In credit swaptions, the sensitivity of the option to changes in the spread of the underlying credit default swap.

**Delta exchange**

In an index tranche trade, the process by which the index tranche and its hedge on the main index are traded simultaneously using pre-agreed, industry-standard deltas.

**DerivServ**

A trade confirmation system for over-the-counter derivatives run by Depository Trust & Clearing Corporation (DTCC). Most credit default swaps are now cleared through this system.

**Detachment point**

Also known as exhaustion point, the maximum level of losses in the portfolio to which a synthetic CDO or index tranche is exposed.

**Digital settlement**

See binary settlement.

**Discount factor**

See market value CDO.

**Dynamic proportion portfolio insurance (DPPI)**

See constant proportion portfolio insurance.

**E****Effective date**

The date on which a credit default swap comes into effect.

**Equity**

Also called first loss, the tranche in a CDO or securitisation capital structure that is the first to absorb losses. This is identical in concept to the position of common shares in a corporate capital structure. However, in CDOs and securitisations, the first-loss tranche does not take the legal form of common shares. CDO equity usually takes the form of preference shares, income notes or junior debt obligations. In a single-tranche CDO or index tranche, a credit default swap or credit-linked note with an attachment point of zero is known as the equity or first loss.

**Equity default swap**

A barrier equity option which uses terminology similar to a credit default swap. The trigger or equity event is a fall in the reference share price below a certain level at any point during the life of the trade and is analogous to a credit event.

**Equity default obligation**

A portfolio equity default swap.

**Exhaustion point**

See detachment point.

**F****Face value**

See par value.

**Failure to pay**

A credit event used in most credit derivatives. Settlement can be triggered if the reference entity fails to make interest or principal payments when due after a permitted grace period.

**Financial**

A financial borrower – that is, a bank or insurance company. Corporates and financials make up two of the biggest categories of reference entities in the credit derivatives market.

**First-loss tranche**

See equity.

**First-to-default basket**

See nth-to-default basket.

**Flat**

See credit curve.

### **Fully distributed or full-capital-structure CDO**

Compare with single-tranche CDO, any CDO in which multiple tranches are issued simultaneously to absorb all the different levels of losses in a portfolio. All cash CDOs and some synthetic CDOs are issued with full capital structures.

### **Funded credit default swap**

A credit default swap in which the protection seller makes an initial payment that is used to settle any credit events. A funded credit derivative often takes the form of a credit-linked note issued by a special purpose vehicle or by a credit derivative dealer itself. The main advantage of a funded credit default swap is that the protection buyer is not exposed to the counterparty risk of the protection seller. Credit-linked notes can also be bought by many investors that are not permitted to enter into an unfunded credit default swap.

## **G**

### **Gamma**

The rate of change of delta compared to the underlying.

### **Gap risk**

The risk that credit spreads will suddenly jump rather than move gradually, making it impossible to delta-hedge positions.

### **Grace period**

A period, usually of 30 days, in which a borrower is permitted to make interest or principal payments that it has missed.

## **H**

### **Hazard rate**

Also known as the default-intensity rate, the probability that a reference entity defaults at a certain point in time (having survived without default between now and that point in time).

### **Hedge fund**

An actively managed investment vehicle that is intended to produce positive returns regardless of the direction of markets. Although only a small proportion of hedge funds pursue strategies in credit, they have greatly increased their involvement in the market in recent years. Credit hedge fund strategies include long-short credit, structured credit (correlation) and capital structure arbitrage.

### **High grade**

See investment grade.

### **High yield**

Also known as sub-investment grade or junk, a credit rating of below Baa3 (Moody's) or BBB- (Standard & Poor's or Fitch Ratings). See also investment grade.

**Hivol index**

A credit index comprising a volatile subset of an investment grade index. These indices currently exist for North America (CDX NA HVOL) and Europe (iTraxx Europe HiVol). See main credit indices (page 12).

**I****Idiosyncratic gamma**

The extent to which changes to the delta of a specific reference entity change the delta of a synthetic CDO or index tranche.

**IMM dates**

See standard maturity dates.

**Implied correlation**

The level of default correlation implied by the price of a synthetic CDO, index tranche or nth-to-default basket. Correlation is the parameter that explains why the spread of a tranche can move even when the average spread of its reference portfolio remains unchanged (or vice versa). Therefore correlation can be implied from the price of tranches (or nth-to-defaults) relative to underlying spreads in the same way that volatility is implied from the price of options relative to their underlyings.

**Implied spread volatility**

The level of credit spread volatility implied by the price of a credit swaption. If the price of an option changes while the price of the underlying remains constant, the parameter that has changed is the market's expectation of the volatility of the price of the underlying.

**Implied writedown**

A credit event often used in credit default swaps referencing cash CDOs.

**Index**

See credit index.

**Index roll**

The process, which usually takes place every six months, of changing the composition of a credit index to ensure that it remains representative of the liquid credit derivatives market. Names are selected by an index administrator following agreed selection procedures and based on dealer input on which are the most liquid names (see liquidity). For most indices only a handful of names change at each roll date. However, for ABX HE and CMBX NA, most securities change from one version to the next.

**Index tranche**

A highly standardised single tranche CDO with a credit index such as iTraxx Europe or CDX NA IG as its reference portfolio. Besides using standard portfolios, the attachment and detachment points, maturity and documentation of index tranches are also standardised, ensuring that these products are much more liquid than bespoke synthetic CDOs. See standard index tranches (opposite)

**Inner CDO**

See synthetic CDO-squared.

**Interdealer broker**

Also known as interbank broker, a firm that acts as an agent facilitating trades between dealers. Credit derivative interdealer brokers include Creditex, Garban, GFI and Tullett Prebon.

**Interest coverage test (IC test)**

In a cashflow CDO, a measure to protect senior note holders in the event of a reduction in the cashflows produced by the portfolio collateral. If a deal starts to fail its IC test, cashflows are diverted from more junior classes of notes to pay down the liabilities in order of seniority until the deal is back in compliance with the test. The IC test is passed if the interest coverage ratio exceeds a predefined level. The IC ratio is calculated as the proceeds from interest payments on the collateral over a given period divided by the interest payments due on the deal's notes over the same period. Therefore, paying down the most senior notes should increase the IC ratio by reducing the amount of the deal's liabilities and the interest payments due to the noteholders.

**Interest shortfall**

A situation in which an asset-backed security misses one or more interest payments as a result of insufficient funds. This is permitted under the terms of most mezzanine asset-backed securities, and does not usually lead to a credit event in asset-backed credit default swaps. Instead, the protection seller must make payments to the protection buyer to make up the interest shortfall while it occurs. Missed interest payments may be reimbursed at a later date, and this will require the buyer of protection to make additional payments to the protection seller.

**Investment grade**

Also known as high grade, a credit rating of Baa3 (Moody's), or BBB- (Standard & Poor's or Fitch Ratings) and above. Many investors are prohibited from investing in debt without an investment grade rating. The boundary between investment grade and high yield (sub-investment grade) is therefore an important technical factor that can affect the level of credit spreads.

**Isda (International Swaps and Derivatives Association)**

The industry association for over-the-counter derivatives. Among its most important activities are producing standard templates and definitions for derivative documentation. Isda also lobbies governments on behalf of the industry and promotes the benefits of over-the-counter derivatives including credit derivatives.

**ITraxx**

A family of European and Asian credit indices. See main credit indices (page 12).

**J****Jump-to-default risk**

The risk that a credit defaults suddenly before the market has had time to factor its increased default risk into current spreads. Compare gap risk.

**Junior debt**

See seniority.

**Junk**

See high yield.

## **L**

### **Liquidity**

The ability to sell an asset or unwind a position when necessary. Credit markets are much less liquid than other sectors of the financial markets such as major equities. Bid-offer spreads tend to be wide and the number of dealers in a particular credit or product is often small. Within the credit derivatives market, credit indices are by far the most liquid products, with bid-offer spreads usually only half of one basis point.

### **Loan-only credit default swap (LCDS)**

A credit default swap in which a credit event can be triggered by any of the reference entity's debt obligations but in which only obligations of a certain seniority can be delivered. Loan-only credit default swap spreads should move in line with loan prices rather than with bond spreads and therefore allow traders to go short loans and to take a view on secured debt against other parts of the reference entity's capital structure.

### **Long-short credit**

A credit trading strategy that involves taking selective long and short positions in credit. Long-short credit is among the most important strategies pursued by credit hedge funds.

## **M**

### **Managed CDO**

A CDO in which a portfolio manager is appointed and paid a fee to make changes to the collateral or reference portfolio during the life of the transaction. The life of a managed deal can be divided into three phases. The first is the ramp-up, lasting up to a year, during which the manager invests the proceeds of the sale of the CDO's securities. Second is the reinvestment or 'revolver' period, where the manager actively manages the CDO collateral, reinvesting cashflows as well as buying and selling assets. In the final period the collateral matures or is sold and the investors are repaid.

### **Market maker**

See credit derivative dealer.

### **Market standard documentation**

A set of credit derivative terms regarded as standard for a particular type of reference entity. Market standards include which credit events apply to the contract, which maturity dates are used and which time zones apply. Non-standard contracts are priced at a premium compared to those using market standard documentation.

## **Market value CDO**

By contrast with a cashflow CDO, a market value CDO is one in which the market value of the collateral is frequently measured. Whereas in a cashflow CDO, the overcollateralisation test is based on the ratio of the par value of assets to the size of the liabilities, in a market value CDO, the test is based on the ratio of the market value of the collateral to the size of the liabilities. Market value CDO portfolios are typically traded much more actively than those of cashflow CDOs. There are fewer explicit restrictions on the manager's ability to invest in certain assets. However, each type of investment carries a different weighting in calculating the overcollateralisation ratio. This weighting, known as the discount factor, is based on the asset's liquidity. As a result of these more flexible guidelines, market value CDOs tend to be used to carry out a broader range of investment strategies than cashflow CDOs.

## **Master CDO**

See synthetic CDO-squared.

## **Maturity**

The date at which the principal of a debt obligation becomes payable in full. By extension, the term is often applied to the scheduled termination date of a credit default swap.

## **Merton model**

Also known as firm-value or latent variable model, the Merton model says default occurs when the value of a company's assets falls below the value of its debt. Since the value of a company's assets are reflected in its share price, the model establishes a link between credit and equity prices.

## **Mezzanine**

For asset-backed securities and CDO tranches, ranking in the middle of the capital structure – that is, above equity and double B tranches but below triple A. For synthetic CDO and index tranches, the term describes tranches with risk profiles ranging from around triple-B to triple A (but below super senior). For example, 3-6% or 3-7% index tranches (approximately triple B) are often described as junior mezzanine, while 6-9% or 7-10% tranches (double A to triple A) are sometimes called senior mezzanine.

## **Mezz-equity trade**

A correlation trading strategy particularly popular in the early days of the index tranche market which involves selling protection on equity tranches and buying protection on mezzanine tranches. This strategy is short correlation.

## **Monoline insurer or monoline wrap provider**

An insurance company that takes on credit risk by providing guarantees on bonds and selling protection on ABS and CDO tranches. Monolines typically invest in investment grade exposures and benefit from triple A counterparty credit ratings. The five main monolines are Ambac, CIFG, Financial Guaranty Insurance Company (FGIC), Financial Security Assurance (FSA) and MBIA.

## **Monoline reinsurer**

An insurance company that takes on credit risk indirectly by writing insurance policies for monoline insurers. Some monoline reinsurers, such as Assured Guaranty and Security Capital Assurance (formerly XL Capital Assurance), act as direct monoline insurers as well as offering reinsurance.



## **N**

### **Negative basis trade**

For single name credit trading, a trade in which the trader buys a bond and buys credit default swap protection on the same name. If the basis is negative – that is, the credit default swap spread is less than the bond spread – the trader can receive a spread without taking on any default risk.

### **Not contingent**

See reference obligation characteristics.

### **Notice of physical settlement (nops)**

A legal document that the protection buyer delivers to the protection seller in order to trigger physical settlement of a credit derivatives following a credit event. The notice of physical settlement was introduced in the 2003 credit derivative definitions, replacing the previous 'notice of intended physical settlement' (nips), which was not legally binding on the protection buyer.

### **Notice of publicly available information**

A notice sent by the counterparty triggering a credit event (usually the protection buyer) confirming that the supposed credit event has taken place by reference to a public source of information such as a newspaper or wire service article. The requirement for a notice of publicly available information is designed to prevent credit events being triggered by deals agreed in secret.

### **Notional**

The notional of a credit default swap is the protection seller's maximum possible exposure as a result of default by the reference entity (or entities). For example, in a single name credit default swap with a notional amount of \$10 million, settlement is based on the recovery value of debt with a face value of \$10 million.

### **Not subordinated**

See reference obligation characteristics.

### **Novation**

Also called assignment, the process of transferring an outstanding derivative contract from one dealer to another. It is commonly used by hedge funds that unwind trades in order to get the best price available in the market. Novations are also used in managed single tranche CDOs and credit CPPI transactions to allow the manager to execute a trade or substitution at a better price than the one available from the dealer on the transaction.

### **Novations protocol**

An Isda document published in September 2005 that defines the correct procedures for assigning or novating over-the-counter derivatives. See novation. Firms that have adhered to the protocol agree to inform the outgoing dealer in writing by 6pm on the day they assign a trade to a new dealer. The protocol was introduced to make the processing of credit derivative trades more efficient.

### **Nth-to-default basket**

A credit derivative in which the payout is linked to one in a series of defaults (such as first-, second- or third-to-default), with the contract terminating at that point. Nth-to-default baskets have similar characteristics to synthetic CDO tranches, in terms of leverage and exposure to correlation. However, their mechanics are different: in an nth-to-default contract, the trade settles on the defaulted reference entity for the full notional of the contract following the specified credit event. Also, nth-to-default baskets typically include many fewer names than a synthetic CDO portfolio – usually between five and seven credits.

## **O**

### **Obligation acceleration**

A credit event now used only in some emerging market credit default swaps. The credit event can be triggered when an occurrence such as a covenant breach on one debt instrument leads to the acceleration of other debt obligations. Acceleration means the holders of a debt obligation can demand immediate repayment in full.

### **Obligation default**

A credit event now rarely used in credit derivative documentation. The credit event can be triggered when an occurrence such as a covenant breach on one debt instrument makes it possible for other obligations to be accelerated.

### **Offers-wanted-in-competition (owic)**

A list of positions on which a counterparty seeks competitive offers in the hope of achieving the best possible price. Compare bids-wanted-in-competition (b-wic).

### **Off-the-run index**

See on-the-run index.

### **On-the-run index**

The current series of a credit index. Most indices roll every six months, with a new basket of names introduced. (See index roll.) On-the-run indices are typically more liquid than previous series, which are known as off-the-run indices. However, some off-the-run indices are also actively traded.

### **Outer CDO**

See synthetic CDO-squared.

### **Overcollateralisation ratio**

See overcollateralisation test (see page 34).

### **Over-the-counter (OTC) derivative**

Any derivative traded directly between two counterparties rather than on an exchange.

### **Owic**

See offers-wanted-in-competition.

## **P**

### **Par building**

See overcollateralisation test.

**Par coverage test**

See overcollateralisation test.

**Participation rate**

In a constant maturity credit default swap, the proportion of the reference rate at which protection payments are set. For example, the reference rate may be the five-year credit default spread on Ford and the participation rate may be 80%.

This means payments are calculated as 80% of the than five-year credit default swap spread on Ford at each quarterly payment date. Participation rates reflect the steepness of the credit curve, with steeper curves translating into lower participation rates.

**Par value**

Also known as face value, the principal amount of a bond. Debt securities are usually issued at par. However, they may be issued at a premium or discount to par. For example, an investor could expect to pay a steep discount for a zero-coupon bond. When bonds are traded in the secondary market, they usually change hands for more or less than the par value, reflecting their market value based on prevailing interest rates and the credit risk of the issuer.

**Pay-as-you-go (PAUG or PAYG) settlement**

A form of settlement used in asset-backed credit default swaps which allows two-way payments between the protection buyer and protection seller during the life of the contract. If the reference obligation is affected by interest shortfalls or principal writedowns, the protection buyer compensates the protection seller. These amounts are paid back to the protection buyer if the interest shortfalls or principal writedowns are reversed. The protection buyer has the option of physically settling the credit default swap if there is a principal writedown.

**Payer**

A credit swaption giving the option buyer the right to buy protection on a certain date at a certain price. This is equivalent to a put option on a bond.

**Physical settlement**

A payout following a credit event in which the protection buyer delivers an eligible obligation (a deliverable obligation) to the protection seller in exchange for the par value of the asset. Physical is the standard form of settlement for most credit derivatives. (See cash settlement.)

**Points upfront**

A convention for trading credit default swaps with wide spreads. The credit default swap spread is present-valued and paid by the protection buyer to the protection seller at the start of the trade. Alternatively, a portion of the payments may be present-valued and paid upfront, with the remainder paid as a conventional running spread. Trading points (percentage points of the notional) upfront eliminates or reduces the risk that a credit event takes place before the protection seller has received any income from the credit default swap. Typically, names start to trade with points upfront once their spreads rise above about 500 basis points. 0-3% index tranches also trade with points upfront in addition to a running spread.

**Positive basis trade**

For single name credit trading, a trade in which the trader goes short a bond using the repo market and sells credit default swap protection on the same name. If the basis is positive – that is, the credit default swap spread is greater than the bond spread – the trader can receive income without taking on any default risk. Positive basis trades are less common than negative basis trades because the repo market for most corporate bonds is not liquid.

**Preferred credit default swap (PCDS)**

A credit default swap in which deferral of preferred share dividends (as well as failure to pay bond coupons) counts as a credit event. Unlike in a standard credit default swap, preference shares can be delivered to the protection seller following a credit event. These features mean the spreads on a preferred credit default swap should follow the price of the reference entity's preference shares rather than its debt. To date, preferred credit default swaps have mainly traded on financial reference entities.

**Principal coverage test**

See overcollateralisation test.

**Principal writedown**

A reduction in the principal of an asset-backed security as a result of losses from the portfolio being allocated to this tranche. Principal writedown does not necessarily trigger a credit event. In an asset-backed credit default swap. Instead, the protection seller can be required to make a payment to the protection buyer to compensate for the writedown. Principal writedowns can usually be reversed as a result of an improvement in the portfolio, and this leads to additional payments being made from the protection buyer to the protection seller.

**Project Red**

See Red.

**Protection buyer**

The counterparty that hedges or goes short credit risk in a credit derivative.

**Protection seller**

The counterparty that assumes credit risk in a credit derivative.

**R****Ramp-up**

The process of assembling a portfolio of assets in a CDO or other credit investment vehicle.

**Rating**

See credit rating.

**Receiver**

A credit swaption giving the option buyer the right to sell protection on a certain date at a certain price. This is equivalent to a call option on a bond.

**Recovery lock**

See recovery swap.

**Recovery swap**

An agreement to swap a fixed recovery rate for a real recovery rate following a credit event. Recovery swaps are usually traded as zero-premium credit default swaps with the reference price set at the fixed recovery rate rather than 100. This form of recovery swap is also called a recovery lock. Recovery swaps usually trade only on credits that are nearing default.

**Recovery rate**

The value of a borrower's debt at some point after it defaults.

**Red (reference entity database)**

A list of reference entities and reference obligations, which has been checked for accuracy (scrubbed) by a law firm (currently Allen & Overy). The purpose of the database is to eliminate confusion over how to refer to reference entities and obligations in credit default swap documentation, and therefore avoid disputes and failed trades. Red was developed in 2002 by a consortium of dealers. Since 2003 It has been owned and administered by data company Markit (originally known as Mark-it Partners).

**Reference entity**

The borrower (or other entity) whose default triggers a payout in a credit derivative.

**Reference obligation**

A bond, loan or other obligation that is eligible to trigger a payout in a credit derivative. The reference obligation serves as a marker of the type of obligations that trigger a credit event (see reference obligation category, reference obligation characteristics).

**Reference obligation category**

In credit default swap documentation, a description of the general type of obligations, such as bond, loan or borrowed money, that can trigger a credit event. The precise features of an obligation eligible to trigger a credit event are defined in the reference obligation characteristics section. See also deliverable obligation category.

**Reference obligation characteristics**

See page 42.

**Reference rate**

In a constant maturity credit default swap, the current credit default swap spread that determines the floating level of protection payments. The proportion of the reference rate used to determine the protection payment is known as the participation rate. Usually, the reference rate is for the same name as the reference entity on which the constant maturity credit default swap is written.

**Repudiation/moratorium**

A credit event now used only in sovereign credit default swaps. The credit event can be triggered if the borrower issues statements repudiating its debt or declares a moratorium on debt payments.

**Reserve**

See constant proportion portfolio insurance, credit CPPI.

**Restructuring maturity limitation date**

See restructuring (see page 38).

**Roll**

See index roll.

**Running spread**

See points upfront.

**S****Scheduled termination date**

The date on which a credit default swap terminates, assuming a credit event has not led to the earlier ending of the contract.

**Second-to-default basket**

See nth-to-default basket.

**Self-managed synthetic CDO**

A single-tranche CDO in which the investor is entitled to make changes to the portfolio. These substitutions will produce a gain or loss for the investment depending on the price at which trades are executed.

**Senior debt**

See seniority.

**Seniority**

The ranking of debts in the event of default from senior to junior (or subordinated). The most senior of an issuer's liabilities have the greatest claim to the assets of the entity in the event of default. Seniority can be defined contractually – where the terms of a liability indicate that it is junior to other liabilities – or it can be a result of the corporate structure of the borrower – for example, where lenders to an operating company have greater access to the defaulting group's assets than the creditors of a holding company which owns shares in the operating company.

**Settlement**

The process through which the protection buyer in a credit derivative compensates the protection seller following a credit event. See physical settlement, cash settlement. Physical is the standard form of credit event settlement for credit default swaps. However, cash settlement is frequently used in the documentation for synthetic CDOs. Counterparties also frequently elect to cash-settle. For example, in all defaults affecting credit indices since Collins & Aikman in May 2005, most index counterparties have opted for cash settlement using the final price determined by a credit event fixing.

**Single-name credit default swap**

A credit default swap referencing a single entity. Compare credit index, index tranches, synthetic CDO, nth-to-default basket.

**Single-tranche CDO**

A synthetic CDO created to meet the needs of a particular investor, rather than forming part of a fully distributed CDO. For example, an investor may be willing to invest in a 4% to 5% tranche of a particular portfolio by buying a credit-linked note that achieves a triple A credit rating. The dealer that arranges (buys protection on) the tranche is left with credit and correlation risk that it either hedges using other credit derivatives or retains in the hope of offloading this exposure to other investors at a later date.

**SIV**

See structured investment vehicle.

**Sovereign**

A borrower that is a country. Sovereigns account for a large proportion of all emerging market reference entities. However, in the broader credit derivatives market, they are less popular than corporates and financials.

**Special purpose company**

See special purpose vehicle.

**Special purpose vehicle (SPV)**

Also known as special purpose company, a company created for the sole purpose of acquiring certain assets or derivative exposures and issuing liabilities that are thereby linked solely to those assets or exposures. An SPV is designed to be 'bankruptcy remote' – that is, unlikely to be subject to bankruptcy proceedings. SPVs are used to issue all kinds of asset-backed securities, as well as cash CDOs and credit linked notes.

**Spread**

The difference between a bond's yield and a risk-free rate such as Libor or Euribor. The greater the issuer's credit risk, the higher spread investors will demand. By analogy, the periodic payments a protection buyer makes to a protection seller are commonly referred to as the credit default swap spread (expressed as a percentage of the notional). Like in the cash market, credit default swap spreads on riskier reference entities and longer dated contracts tend to be higher than those on high quality borrowers and short-dated contracts.

**Standard maturity dates**

Sometimes called IMM dates, four dates of each year which most credit default swaps use as their scheduled termination date. The dates are 20 March, 20 June, 20 September and 20 December.

**Steep**

See credit curve.

**Structured credit**

Products comprising tranches of portfolios of credit instruments or exposures. By this definition, structured credit products include cash CDOs, synthetic CDOs and nth-to-default baskets. The term is sometimes used in a broader sense to include all credit derivatives as well as CDOs.

### **Structured investment vehicle (SIV)**

A managed investment vehicle that holds mainly highly rated asset-backed securities and funds itself using the short-term commercial paper market as well as the medium-term note (MTN) market. Because of the rolling nature of its funding, an SIV is highly dependent on maintaining the highest possible short-term and long-term credit ratings. SIVs differ from cash CDOs of asset-backed securities in that their portfolios are marked-to-market, with their ratings based on capital models agreed with the rating agencies. SIVs also have simpler capital structures than CDOs, usually comprising a junior tranche of capital notes beneath a block of senior liabilities with the same seniority.

They have smaller liquidity facilities than commercial-paper conduits – which also invest in high grade ABS. SIV managers include both commercial banks such as Citigroup and Bank of Montreal, and investment managers such as Gordian Knot.

### **Subordinated credit default swap**

A credit default swap in which the reference obligation is a subordinated debt instrument issued by the reference entity. This means that the relevant recovery rate following a default will be determined by the value of the entity's subordinated debt. As a result, a subordinated credit default swap will normally trade with a higher spread than a senior credit default swap on the same name. Subordinated credit default swaps are traded mainly on financial reference entities such as banks and insurance companies.

### **Subordination**

The amount of losses a portfolio has to experience before a synthetic CDO tranche suffers any loss.

### **Sub-investment grade**

See high yield.

### **Successor**

In credit derivative documentation, the reference entity or entities that succeed the original reference entity if a succession event takes place.

### **Succession event**

In credit derivatives documentation, an event such as a merger or spin-off that leads to one entity succeeding to the debt obligations of another entity. Confusion over the documentation of successor and succession event can cause great uncertainty over the value of credit default swap protection on companies involved in acquisitions, buy-outs and corporate restructurings.

### **Super senior**

A tranche that benefits from subordination that is implicitly or explicitly rated triple-A.

### **Synthetic CDO**

A CDO in which the underlying credit exposures are taken on using a credit default swap rather than by having a vehicle buy physical assets. Synthetic CDOs can either be single tranche CDOs or fully distributed CDOs. Synthetic CDOs are also commonly divided into balance sheet and arbitrage CDOs, although it is often impossible to distinguish in practice between the two types.



### **Synthetic CDO squared**

Often written CDO<sup>2</sup>, a synthetic CDO in which the reference assets are themselves single tranche CDOs. This results in a CDO with a two-tier structure. Once losses attach in the bottom tier of 'inner' CDOs this can cause losses to the top tier 'master' or 'outer' CDO.

## **T**

### **Theoretical value**

Of a credit index, the weighted average spread of the constituents. If the index is trading with a higher spread than its theoretical value it is said to be cheap to theoretical. If the index is tighter than the theoretical value, it is said to be expensive or rich to theoretical.

### **Theta**

Also called time decay, the sensitivity of a derivative to its time to expiration. Time to expiry has a particularly important effect on the price of synthetic CDO tranches.

### **Time decay**

See theta.

### **Tradable credit fixings**

Reference rates for certain credit derivatives calculated through a process in which dealers contribute prices at which they commit to trade if they cross with other dealers' prices.

### **Trade date**

The date on which the terms of a credit default swap are agreed.

## **U**

### **Unfunded credit default swap**

A credit default swap in which the protection seller makes no payments to the protection buyer unless there is a credit event. Since unfunded credit default swaps leave the protection seller exposed to the counterparty risk of the protection buyer, they usually take place only if the protection seller is a highly rated entity such as a monoline insurance company.

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